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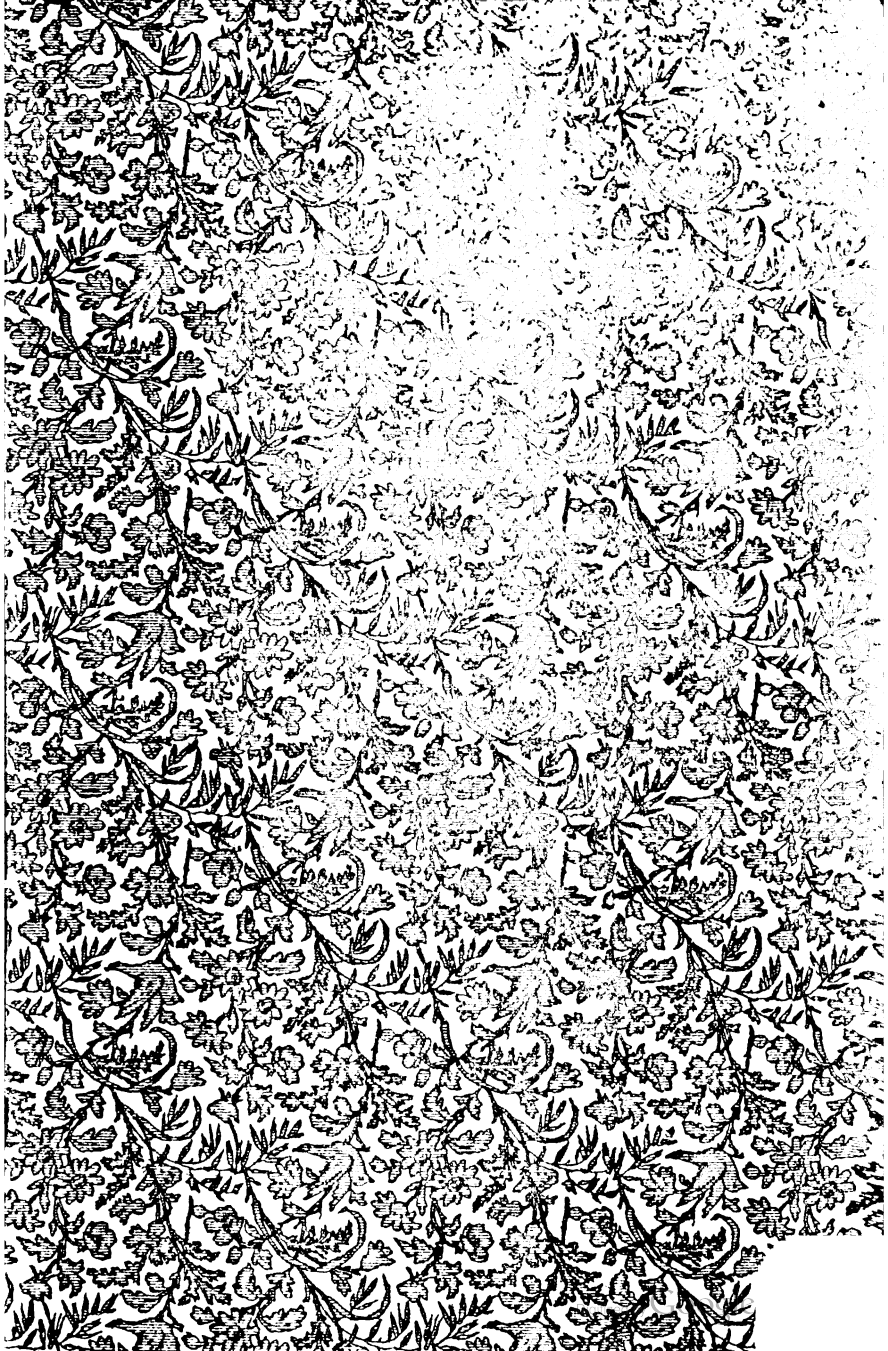

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MATHERAN HILL:

ITS PEOPLE, PLANTS,

AND

ANIMALS.

BY

J. Y. SMITH, M.D.,

BOMBAY MEDICAL STAFF.

SECOND EDITION

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MATHERAN HILL:

ITS PEOPLE, PLANTS, AND ANIMALS.

CHAPTER I.

Early English History, as related by the Kotwal, with remarks on the Scenery of the Hill, its Climate, Rock-structure, and Water supply.

IN the month of May, 1850, Mr. Hugh Malet, of the Bombay Civil Service, while halting at the Chauk Bungalow on his way from Poona to Tanna, strolled one evening, with his gun in his hand, half-way up the hill; and, having satisfied himself that it was worthy of further exploration, returned next day, under the guidance of the Patel of Soondeewarra, with a determination to reach the summit. The ascent was made by the small footpath that skirts the Amraee, or Mango Grove, on the westward side of Chauk Point. It is still used by coolies, and emerges on the brow of the hill close to the column of black rock, bearing a single jambul tree, that conspicuously marks the spot. From thence Mr. Malet

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and his guide made their way to the small stream that then ran freely, even in May, through the Bund valley; they drew from it two bottlesful of clear water, then dug from the site of the old bazaar a basketful of earth, and chipped some laterite stone, to take away with them for more careful examination thereafter. Carrying with them the water, earth, and stone, they descended by the path that runs along the opposite side of the Chauk spur and traverses the magnificent grove of mangoes, jambuls, palms, and other fine forest trees, with their tortuous rigging of climbers that clothes the plateau under Sphinx Point —the Amraee of those days, but now better known as the Ram Bagh. There Mr. Malet parted with his guide, and, greatly pleased with all he had seen, went on his way to Tanna for the season.

In the following September he sent up to the Patel supplies of sheep, fowls, rabbits, &c., with instructions to have them conveyed to the hill top, and there await his arrival. Meanwhile, Madhoo Rao, the son of the village chief, and long *facile princeps* of the hill-people, set about building a hut on site No. 2, and in the course of six weeks got it ready for the collector. The latter came up to occupy it on the 1st of November, and had his office-tents pitched around him. He remained about a month, and, having cleared footpaths to the several points, departed on his annual tour through the district. In February of 1851 he returned for the third time,

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accompanied by Captain Harry Barr, who had, unknown to Madhoo Rao, repeatedly climbed the hill before, and knew it well. Site No. 13 was selected by Captain Barr, and he built a wattle-and-dab house on it after the monsoon of the same year. At that time, also, Mr. Malet had three more bungalows constructed, two of them temporary, on sites Nos. 1 and 9, and one of stone, now known as "The Byke." Mr. Fawcett then chose the fine piece of flat ground near Echo Point for a house, having an iron framework and walls of bamboo; it is still standing and in fair order, but nearly all the others, that were originally temporary, have since been replaced by substantial structures of stone and lime. In 1852, Mr. Malet, to whom all who love the hill are so much indebted, obtained a grant of Rs.500 from Government for the improvement of the path leading to Chauk. This had, up to that time, been little better than the bed of a torrent, and was traversed with difficulty; but, on its repair, Mrs. Malet, the first English lady whose foot trod the soil of Matheran, was carried up in a common chair fastened with ropes to poles of bamboo. The Kotwal relates that her eyes were bound with a handkerchief as her bearers climbed the successive bands of black rock that separate the forest belts encircling the hill, and that, on gaining the last giddy steep, they were unclosed that she might gaze with delight on the far-reaching range of the Sahyadrees that overhang the Konkan. Matheran was now

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fairly opened; and, in 1853–4, building was carried on briskly, the sites being chosen very nearly in the order they are numbered on the map. It was in the hot weather of 1855 that Lord Elphinstone, with his staff, first visited the hill. He too was charmed; and, on his return after the rains, devoted himself to the widening of the roads, the storing of water, and other useful improvements. With great judgment he carried the roads, as much as possible, along the natural levels, where they are little affected by the weather, and need no repairs. He chose the site for Elphinstone Lodge, built a hut on it, and laid the foundation of the fine bungalow, with over thirty acres of well-wooded ground, that is now known by that name. A bund, constructed by him in the valley that separates the Panorama Ridge from the body of the hill, being of earth only, unfortunately gave way with the first rains—the labour of a large body of prisoners, and the cost of employing elephants to aid in the work, all going for nothing. Had the result been otherwise, a fine ornamental sheet of water would have been formed at the spot, and to its banks might have been transferred the gardens of the Chinese convicts that now contaminate the waters of the Bund valley. In the course of the two following years the permanent reservoirs were finished. The capacity of the lowest one has since then been somewhat increased, but they are still insufficient; and it is to be regretted that Captain Fuller's suggestion to erect a

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bund a little further down, high enough to fill the valley with water, was not adopted at the beginning. The smaller reservoirs, constructed of late years, have in some cases proved complete failures, and in none have they quite fulfilled the expectations that were formed of them: the springs that feed them cease to run freely early in the season, and the ground about, either from want of space, a porous soil, or fissures in the rocks, is unfavourable for storage. The first tracing of the Ghaut Road was made by Major Peacock, and enlarged by Dashwood Graham. It has been little altered above; but towards the mango tope it was carried through the valley to Narel, instead of following, as at present, the easy slope of the long spur that runs down to the village. The foundation of the church was laid in 1858, and the building completed in three years. Several additions to the interior, and especially the fine window presented by Michael Scott, have since been made, and it was consecrated by Bishop Harding in 1865. The other public buildings are of more recent construction. They are the superintendent's office, which includes those of the post and telegraph, the new bazaar, sanatarium, and dhurmsala. Two years ago a house was bought by Government for the medical officer in charge, and now only a small hospital is needed to complete the most urgent arrangements for the public convenience.

The early residents on the hill found much exercise for their taste and ingenuity in devising names

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for the several points and other striking features of its scenery; and if in this they have not always been successful, it must be remembered that the gift is a rare one, developed only with time and the growth of other influences than those affecting a practical people in a strange country. The names Chauk, Panorama, and Echo tell plainly enough their own origin, and so do Monkey, Sphinx, and Porcupine,—although it may be as well to explain that of the three latter, one is a favourite resort of the wanderu—that a mass of trap overhanging the Amráè, as seen from "The Byke," presents features suggestive of a sphinx—and that the long rocky snout of the last point, the bushes behind it, bare and tormented by the wind, with the well-wooded bank above, represent not inaptly "the fretful porcupine." Hart, Louisa, and Alexander are personal designations more liable to obscurity; but it has been ascertained that a well-known Secretary of the period gave his name to the first, that Mrs. Edward Fawcett is the Louisa in question, and that a young captain of dragoons, who married Mrs. Malet's niece, has left, in his name of Alexander, a more enduring memento of the event than could have been foreseen when it was so lightly given. Ghàrbut is the only native name of a point that has been retained, and is derived from the profusion of flints, or quartz-crystals, that are found on the low spur running from it towards the Ghauts. Maldoongar is the necklace, or string of wooded

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hillocks, forming the ridge so called; and Matheran itself, meaning the table-land, could not have been more aptly named. The form of the hill is altogether irregular, and does not bear comparison with anything familiar. It is written of Columbus, that, when Queen Isabella asked him to give a description of Jamaica, the only mode of illustration he could think of was, to crumple a piece of paper in his hand, and, opening it out, to place it before her: so for Matheran—were a very unshapely Jerusalem artichoke or root of ginger at hand, either might, with a little paring to represent the flat laterite-capped central ridges, be fitly enough used for a similar object.

This layer of laterite it is that, porous and absorbent in a high degree, and lying like a huge sponge on the black rock, gives passage to the rain-water, and drains it towards the springs. Issuing from the line of junction around the crest of the hill, the rain comes out almost as pure as when it fell from the clouds, or charged only with iron, in some parts so plentifully, that, on throwing chips of jambul into the spring, the water in a few hours becomes black as ink.

The highest plateaux of red rock are about two thousand seven hundred feet above the sea-level. They are usually bare, or but scantily wooded, whereas the sides immediately below the scarp, sloping or in natural terraces, are clothed with forest trees and brushwood in endless variety, and strewed with boulders that have been shattered from the crest

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during the process of upheaval. These masses of rock are of great size, and sharply angular when lying near the edge of the plateau, but become weathered and rounded at a distance from it. All stages of decomposition may be noticed in the laterite. At one place, as in sinking a well, it will be seen soft and yielding, with layers of bright magnetic iron ore still unmixed with the clay. At another spot it will be assuming the tubular structure while the oxidation of the iron is in progress, and again in heaps of boulders, with hard polished surface and flinty texture, in which chemical action from exposure has entirely ceased. Among its debris, which in some parts is over sixty feet in depth, but not in the rock itself, are occasionally seen embedded blocks of columnar basalt, with angles as sharp and surfaces as smooth as on their first formation.

The trap, which constitutes the body of the hill, lies in several layers, the enormous thickness of which is well seen from some of the points. It has usually a plain surface, but in some places is columnar ; its structure is more or less amygdaloidal, and in the cavities are found various minerals of the zeolite family. Apophyllite is, perhaps, the most common, and, when first exposed by blasting, its fine crystals are of wonderful beauty. Heulandite is also abundant, as well as two kinds of mesotype, stilbite, natrolite, and others, of which the finest samples, obtained chiefly from the Bhore Ghaut, may be seen

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in the museum of the Asiatic Society. Crystals of quartz, streaked so closely as to decompose the light, and become brilliantly iridescent, are common; and some of an amethystine tint have been taken from a newly-opened cavity, of a most dazzling lustre, which is lost on exposure. The precious opal is said to have been found in the Ghauts opposite, in corresponding rocks, but no such fortunate discovery is known hitherto to have been made in those of Matheran. Varying in chemical composition, the layers of trap disintegrate, and form soil on the hill-side with more or less facility. In this soil large trees have sprung up, and the layers are thus separated one from another by belts of forest growing on the slopes that have been formed of their detritus. The laterite produces a poorer soil, but when completely decomposed and well mixed with vegetable mould, the stateliest trees, especially with water near, spring up in it also. Numbers of these on all parts of the hill, when it was first occupied, were found charred on their trunks and lopped of their branches, so as to expose and manure the ground for the Dalé cultivation, that was then practised by the native tribes. To this profitable but wasteful mode of culture an immediate stop was put by authority, and the protecting jungle allowed to grow freely, so that now hardly a spot is left, where trees can grow, without its shady covering of evergreens. Objections have been made to this, and strong opinions expressed for

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and against it. There can be no doubt that, to secure the free circulation of air, and for opening up the fine views often hidden by the high wood, a clearance of the jungle is in many places desirable; but experiment has proved that the wholesale destruction of underwood, by which the easily-heated soil is exposed to the fierce rays of a vertical sun, acts as a check on the luxuriant growth of neighbouring trees. Some of the largest, whose roots strike deeply, may be independent of it, and in the true forest, which forms deep shade for itself, the underwood entirely disappears; but there is little of this on the summit of the hill, and the ordinary woods grow better with the ground protected. One objection only, and that opposed to popular opinion and practice, to the unlimited growth of the jungle, lies in possible failure of the water supply from the springs as the hill becomes more richly wooded. Had this rested on native testimony only, the unlooked-for result might have passed unheeded; but late experiences on the Nilgiri Hills, when cutting down the forest for planting the cinchonas, have been minutely recorded, and appear to confirm it.

Mr. M'Ivor thus writes from Utakamund in April, 1867:—"The whole of my experience establishes that the flow of water is greatly increased by clearing away the jungle in the vicinity or upon the watershed of streams. I have made several interesting experiments, and in every instance have found that

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cutting the jungle increased the flow of water in the stream, while planting on its banks or around its source has greatly diminished or dried up the supply." Dr. Cook, superintendent of Mahabaleshwur, also writes as follows to the same effect:—"The opportunity of making a practical experiment on the subject was afforded me last year, the results of which have convinced me that great loss is experienced in dry climates by allowing large trees to grow in immediate contiguity to watercourses. While engaged in excavating a tank for the supply of water to Malcolm Peth, I observed one of the supply streams to be gradually failing, until in the dry weather it had dwindled altogether away, and the nullah had become dry. I then caused the trees, which grew thickly on the sides of the ravine, to be cut down for a distance of thirty or forty yards, and others further up to be thinned and cleared. Within a few days water again appeared in the nullah, and in a short time commenced to flow as before."

The stream in the Bund valley at Matheran is described as having been considerably larger in former days than it is now. It was concealed and sheltered by reeds and other water plants, and at the hottest season of the year discharged from the cliff a volume of water over a foot in width, and three or four inches deep. As far as one can judge in the altered conditions of the valley, there is no such flow at the present time, but a mere trickling from the springs in the hot

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weather before clouds pass over the hill, and year after year the people are forced to have earlier recourse to the stored water in the reservoirs, which is not nearly so pure and pleasant to drink. This diminished flow is accounted for, and with some show of reason, by the enormous exhalation from the evergreen and over-abundant foliage, while the dry, parching winds of March and April are blowing over the hill; not a cloud is attracted during those months, and the whole of the moisture sucked up from the ground is carried towards the plains, without hope of immediate return either as shower or vapour.

The height of Matheran, and its proximity to the sea, will always secure for it an abundant water supply, sure as the melting snows of the Himalayas, whether it is bare or wooded; and its geological formation further ensures for it a thorough soaking. Its forest trees, therefore, need not be spared on the plea that the monsoon will fail; and if clearing and thinning them near the springs, and along the sides of the ravines, will allow the water to flow well into the hot weather, the objections to their sacrifice on other grounds may fairly be put aside. It would seem, however, from trials already made, that the great depth of the underground rills, and the uncertainty of their course, may, in most places, lead to dissappointing results; for these have not been by any means so favourable at Matheran as they would appear to have been at Utakamund and Mahabaleshwur, where the

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experiments were made on the banks of streams and of wet nullahs. The subject is so interesting that further trials should be made, and, what is so often wanted in India, the means made sure for watching them carefully. The whole of the water that flows down from Matheran and the neighbouring hills runs waste to the sea, although even to the most unpractised eye there are many places to be noticed most favourable for storing it. A famine of it indeed prevails for three months in the year; not a drop is available for cultivation on the hill sides, and for domestic use it is carried from long distances. With a rainfall, which for many years past has not been less than 250 inches, and once at least over 400, this ought not to be; and were there not such a fatality attending the construction of tanks and reservoirs, a confident hope might fairly be entertained that, in future years, the lower slopes of the hills around and the country beyond will be converted into terraced fields and well-watered gardens.

With all its heavy rainfall none lodges on the surface at Matheran; there is no marsh on any part of it, and the bed of every nullah is of bare rock. All material for malaria is washed away by the annual deluge, and in most years the thickest jungle on the summit may be entered with impunity. The grass and wood cutters do not suffer from fever, and where this has prevailed the cause has been plainly traced to faulty conservancy. A too adventurous fern-hunter

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may return home with an ague fit should he venture into the deep clefts in the rocks along the crest of the hill, but in open places, or wherever the air moves freely, there is no danger. The climate in the months immediately following the monsoon is very pleasant. It becomes less so as the cold weather advances, and when the dry land winds of the Deccan prevail, all who have suffered from fever or congested liver would do well to leave the hill. In March and April the mid-day heat is oppressive with all exposures but the north. The mornings and evenings continue cool in the shade, and a hot night is exceptional. The aridity of these months and of early May is relieved with the appearance of the first fleecy speck of mist in the Bund valley; from that moment all nature rejoices, and every sense is gratified, with little chance of interruption till heavy rain falls. For all complaints, excepting serious disease of the head or heart, it is then favourable, and, contrasted with the climate of the plains, of much value. Matheran has no great pretensions, however, as a sanatarium in the highest sense, and to trust to its healing influences in severe and complex ailments is mere loss of time. For these it is necessary to go further; but for the malaise and feebleness brought on by a Bombay monsoon, and for all complaints, mental or bodily, that can be relieved by exhilarating exercise amid charming scenery, those who know it well must speak of it with rapturous admiration.

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CHAPTER II.

The Hill Tribes.

THE ranges of the Sahyadris, their spurs towards the Deccan, and the detached hills of the Konkan, are, in common with other mountainous regions of India, inhabited by numerous tribes of primitive people, whose ways and customs, until of late years, were little known. Such information as is here offered regarding them was gathered while botanising and bird-hunting in their jungles, and has no pretension to scientific interest. Guided, however, by the light recently thrown upon the legends, customs, and language of allied races in other parts of the country, it may chance at some future time that to these meagre notes may be added some more worthy of acceptance, and touching on subjects in which scholars are concerned.

Three tribes, differing in their mode of life and more or less in physical conformation and language, are met with on and around Matheran. They are called Dhangurs, Thákurs, and Kátkaris. Their

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number is not known with any precision, but in the order named they are roughly estimated as bearing the relative proportion of fifteen, fifty, and thirty-five in a hundred.

The first are known to be scattered over the neighbouring country as far as Maolì to the north, and towards Sholapore and Sattara on the east and south, and they are believed to inhabit hilly regions at much greater distances ; the second extend towards Nassick in one direction, and southwards by Oomburkhind; while the third abound in most parts of the Tanna collectorate and on the Ghauts, where belts of the Khair tree grow. They all live in the neighbourhood of the Mahratti villages, the Kátkaris close by, the Thákurs a little further removed, and the Dhangurs still deeper in the forest. They associate one with another, and will even eat together, but the food must be prepared by a member of the higher tribe. They do not intermarry, have usually but one wife, and polyandry is unknown among them. The Dhangurs and Thákurs are said to be very healthy, frequently to have large families, and to attain extreme old age. One of the former tribe, whose settlement, or warra, was on Ghárbut, had seven stalwart sons, all the children of one mother ; and another instance is related of a progeny of thirteen, boys and girls together. When the Thákurs were invited to be photographed, nearly fifty of both sexes and all ages came forward, and it was found on in-

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quiry that, with few exceptions, they belonged to the families of three brothers; and one has only to look into a Kátkuri village to be convinced that, in this respect, they vie with their neighbours. There is greater dissimilarity of figure and feature among members of the same tribe than might have been expected, but the distinctions between the three are pretty strongly marked. The Dhangurs are much the best looking, both in face and figure, and although they have no traditions as to their origin, appear to have retained the purity of their race ever since they left their northern home. The fore and central regions of the head are of greater expanse than in the other tribes, the nose often aquiline instead of being broad, with wide nostrils, and sunk at the root, as in the lower races. All have large, though not very prominent, cheek bones, lips rather full, and eyes far within their orbits; their expression is sparkling and genial among the better sorts, but scowling and unsteady in the depressed race. The hands, feet, and limbs are usually well formed, the chest of good breadth, and the whole muscular system, in such as are tolerably fed, well developed. The straight hair common to all is sometimes, especially among the Thákurs, replaced by a curly or frizzled variety; but this and other apparent traces of African blood are probably accidental. The occupations of the tribes are distinct, the Dhangurs being the hersdmen, the Thákurs the agriculturists, and the Kátkuris the

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fishers and hunters, as well as breeders of goats and fowls. The first are often men of substance, as with the family at Ghárbut already alluded to, who were in possession of sixty head of cattle when the hill was occupied, and they are well-to-do as a race. The Thákurs are less prosperous on the whole, while the Kátkuris are always in poverty.

There were twelve settlements, or warras, of two or three huts each, belonging to the Dhangurs on the summit of the hill in 1851, when the first house was built, remains of which may still be seen. They were mostly on the level plateaux, not far from the springs. Each was occupied by a separate family, and as it afforded shelter for both man and beast, varied in size with the wealth of the owner. The largest might be eighty feet in length by thirty or forty in width, and there was a partition wall about the middle to divide the cattle from the family. Their framework was of rough jungle wood, chiefly Ain, Aujun, Jambul, and Sag; and for the walls of wattle-and-dab the Karvì was in universal use. The favourite thatch was of Chirka grass, interlaid with leaves of Sag, Pallus, and Kùmbia—the grass being renewed annually, and the leaves every second year. The roof fell with a gradual slope to within two or three feet of the ground, and the floor was of beaten earth. A large door in front was provided for the cattle, and at one side of the family compartment a small one for their own use. Near the latter was a raised ledge for

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baskets of grain, and both were furnished with strong tatties to make all snug in rough weather.

The Thákur huts are much smaller, and in greater numbers together. They are built of the same materials, and the cattle, when they possess them, are also admitted under the same roof with the family. There is a space screened off for cooking, and the household gods hold a conspicuous place, peacocks' feathers and the flowers of the Till and Kumhil being hung around their images, while little *agdans* lie before them, in which *doop* and *ood* are burnt as incenes. On the rafters of the hut lie, or are hung, all manner of odd things. The *mùsul*, of wood, shod with iron, for cleaning rice and other grains; the *mullai*, or fishing-creel; musical instruments, and masks for the revels of the Hùli, may be noticed among them. Outside, on a platform, are the *kunga*, or grain baskets, very neatly made, of different sizes; and lying about, the *yeerla*, or umbrella, requiring no hands to hold it, the *koita*, for cutting wood, and other articles for field or domestic use.

The huts of the Kátkuris are of the most wretched description, goats taking the place of cattle, and all very filthy. They have on their rafters, in addition to those named above, an instrument peculiar to them, for digging the field-rats from their burrows; but they are much less amply provided with the comforts of life than any of their neighbours.

All the tribes will eat mutton and game, when they

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can be had; but their usual diet consists of natchnee, wurree, rice, and ghee, with the roots and fruits of the jungle. The Thákurs will eat squirrels, but draw a line at rats, which are devoured greedily by the Kátkuris. The wild plantain, growing on all sides of the hill, yields a fecula, which they have no means of extracting properly; but they tear off strips of the tender parts of the plant with their teeth, and after chewing it throw away the fibre. A species of Curcuma yields one of the many varieties of arrowroot; they call it Alamì, and the root is cut in pieces and boiled for food. The Gopùr, or mushroom, is also eaten, and they are skilful in selecting those that are edible. In May the fruit of the Jambùl and the Toorun, a kind of bramble that overhangs all the footpaths, are gathered plentifully. The Kurunda, although a member of a poisonous family, is itself harmless and pleasant to the taste, and the small fruit of the Phunsee is not unlike a cranberry. Below the hill they obtain the soft red fruit of the Attùrnee, and the seeds of the Kokur, Ambooglee, and other plants, are sometimes bruised and eaten.

The leaves of the Apta are used for making cigarettes, and along with those of the Timbùrnee, which are preferred by the Kamatès, are brought to the bazaar for sale daily. The juice of the wild Mangosteen makes a palatable sherbet; and many other trees and herbs, too numerous to mention, hold a place in their esteem either as food or medicine. All

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the tribes are reputed to be immoderate drinkers, not daily or habitually as a rule, but they have a frightful debauch at intervals, and on all occasions of feasting and revelry. The toddy of the Berhly-Mahr, or Fish-tail Palm, a grove of which, interspersed with other forest trees, clothes the northern slope of the panorama ridge, and the spirit distilled from the flowers of the Mowra, a tree common about Narel and as far up as the Mango Tope, are drunk universally. No spirit, however, comes amiss to them, and the gratification of their taste for intoxicating liquors is only limited by their poverty. The fish they catch are the mullya chiefly, which seems to be a kind of carp; and when the rivers are full, the sìoora, eight or ten pounds in weight, runs up from the sea. Lines and nets are little used, but in the rains they construct bunds in the streams, and place baskets made of bamboo, or of twigs of the Nìrgùrni Chìrnì and other climbers, under the curve of the waterfall, into which the fish drop as they are carried over the bund. With less water very neatly made creels are fixed in gaps in the bund, the mouths looking down stream. They are about two feet long, and six or eight inches in diameter. The fish enter by a converging hollow like that of a mouse-trap, and the elasticity of the bamboo slips prevents their escape; there is a second cone opening into the back part of the creel, and through a hole in this compartment they are shaken out. In the dry weather, again, men and women wade up to the waist in the

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pools, using as drag-nets the saris of the latter. They practise "gumping" also, and employ the fruit of the Ghela and the bark of the Rametta for poisoning the fish, with no worse result on their edible qualities than comes from limeing the rivers at home.

For capturing the mungoose, hare, and squirrel, the "hùsali" is frequently seen set on the footpaths, baited with grain, a lizard, or a land-crab. It consists of an elastic bough, eight or ten feet long, fixed at one end firmly into the ground, and having a string tied to the other with a double end. At a short distance is a small circle of twigs stuck into the earth, for containing the bait. One end of the string, in the form of a noose, is spread loosely round this, and to the other are attached two pieces of stick, which are arranged so as to press against each other within the circle and hold the bough bent; the nibbling of the bait which is attached to them displaces the sticks, the bough is set free, and the prey, caught in the noose, is swung into the air, secured still further by a bar of wood and tube of bamboo, that slip up and down upon the string. While wandering about the hill sides, or engaged in their daily work, the people have a way of hailing one another very striking to a stranger. It is heard also among the Himalayas and in the hills of Beloochistân, and, with some modifications, in all mountainous countries throughout the world. The voice is raised with every successive word, and the whole message delivered without drawing breath, the

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latter part of it being dwelt upon in a prolonged yell that fills the valleys with its echoes. The speaker will either continue standing, or dip behind the brow of a hill to await the reply, which comes presently floating in the air from distances almost incredible. The dress of the different tribes, with the exception of that of the Thákur women, hardly calls for remark. It is usually scanty enough. The kumlì, thrown over the shoulders, or arranged as a gùngri on the head and body, with the langùti and dhotur, being the only articles of clothing worn by them, and even these not always; they are commonly met bare-headed, and it is only on occasions of ceremony that a pugrì is worn. The Thákur women have the loins and pelvis tightly bound with a long strip of dark-coloured cotton cloth, having no skirt whatever. It is an article of dress on which they are wont to be extravagant, as much as Rs. 50 being at times expended on it. They wear a chùli, or boddice, also, while all the other women have their robes of one piece, loose and flowing, of which the upper part is thrown over the head, and the rest forms the skirt. Rings of all kinds are worn, most numerous in the ears, both lobe and rim, and by men as well as women and children; bangles and necklaces, too, in abundance; a nose ring occasionally, but the ankles are always free of ornament. The hair is not much cared for by either sex, and has none of the elaborate interlacing with beads and shells, seen among the hill people in other parts of the country.

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In matters of religion the tribes have a good deal in common with their Mahratta neighbours; and it seems probable enough, from what has been learnt of late years, that the latter have derived from them many of the most prominent features of the Sivaite worship. In "The Annals of Rural Bengal," and other recent works, the subject is well handled, and, for minute information on this and kindred subjects, reference may be made to them. Among these people, no less than with the Santals and others, is their religion one of fear; and just as the latter are reported to have replied to a missionary speaking of the omnipotence of God, "What if that strong one should eat us?" so did Dr. Wilson receive for answer from the Kátkuris when discoursing of His goodness, "Men even banish us from their habitations; how, then, will God allow us to approach Him in the future life?" The chief god on the hill is called Pashanáth, meaning the Lord of Cattle, and a Dhangur is his Pùjarì. He has a shrine in a fine tope of ironwood and other trees on the left bank of the Bund valley, a gloomy place, suggestive of what the groves and high places may have been, denounced by the prophets of old. The central figure is a hideous object, not unlike the limbless trunk of a man's body; it is besmeared with red paint, and all around are smaller idols, representing his sepoys and servants. Vessels for burning oil and incense, figures of animals, and remains of offerings are lying about, and among the latter may be noticed a tile from the

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flooring of our English church on the hill. The ground is stained with the blood of goats, and strewn with the feathers of fowls that have been sacrificed, and a framework, from which little bells are suspended, stands in front of the idol. The mode of worship is to place the offering before the god, then to pour rose-water and scatter flowers over his image, mark it with the *tikka*, and burn camphor and *loban* before it. Prayer is then offered according to the wants of the worshipper, and having stated these through the Pùjarì, he tingles a bell, and goes aside to await the reply. Two hollows may be seen on the breast of the image; these are for holding stones, which are placed in them by the priest. During his incantations he has some unexplained means of moving them, and according as one or other first falls from its place, the prayers are answered favourably or otherwise. The goats and fowls are afterwards eaten by the worshippers, and the Pùjarì is allowed a share of the sacrifice.

Smaller gods are in favour at the different villages around, and a sort of sprite called Yeer, not of the Shendrì class, that is, not honoured with the sprinkling of the red sandal-wood paint, is held in dread, as well as the Tiger-god and Matta Devi, the goddess of small-pox, whose shrine is seldom absent.

For a charm they use the head of a cobra, and branches of the Pandree, a small crooked jungle bush with white bark and light-green pointed leaves, are placed about their huts to ward off evil spirits. The

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cry of the owl and the goat-sucker, and the chirping of small birds, are more or less carefully noted when any business of moment is in hand; and it is curious to observe that the animals selected by them, as the interpreters of their hopes and fears, are identical with those chosen by the superstitious in all parts of the world for the same purpose. The cry of the brown wood-owl is of terrible import; it means painful and certain death; the devil-bird they call it, and verily its dismal cries well entitle it to the name. They were once heard on a dark night, close to the bunds, and were mistaken for the groans of a dying man in extreme agony. Search was made, and as the sounds shifted from place to place, it became evident that the cries were those of an owl, and not coming, as at first surmised, from an unfortunate Chinaman with his throat cut.

The marriage ceremonies and modes of courting, the observances at the birth and naming of children, their dancing, music, &c., are all so like those of the hill-people of the Santal country, Central India, and Chittagong, so fully described since these notes were written, that they hardly require to be detailed anew. All the tribes bury their dead—the Dhangurs in a sitting posture, with the face towards the rising sun; the others procumbent, with the head southwards. Among the Kátkuris only the shocking custom prevails of disinterring the body, not on the lapse of a year, as is reported of the Nicobar islanders and other

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wild races, but a fortnight after burial, on which occasion their lamentations are renewed over the ghastly relics, and these, amid orgies of debauchery, are finally disposed of by burning. They do not exhume such as die of cholera and small-pox, but leave them in the ground to undergo natural decay. Little notice is taken of the dead by this tribe afterwards; but among those higher in the social scale, the worship of ancestors, so prevalent amongst allied people, is described as common at recurring intervals, and even for years afterwards, in honour of those who had been of influence in the community. The tribal designations are believed to be derived, in the case of the Dhangurs and Kátkuris, from their occupations, with the addition of "kar," belonging to, or "gar," which is the Prakrit form of the same. "Dhenu" is Sanscrit for cow, and "Kath" is the astringent extract obtained from the khair-tree. The Thákurs, again, are a mixed race, and, as explained by Dr. Wilson, so named from their Hindu chiefs, to whom they adhered when they rose for the defence of the Hindu faith in opposition to the enforced proselytism of Mahomed Begada, who carried his arms from Gujarát into the Konkan forests. Many of the names of the people in common use are the same as those of the helot classes among their neighbours, but there are also some distinctive. The men have, in the two higher tribes, a surname also, which is that of their clan, and is assumed by the wife on the occasion of

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marriage. In a family of Dhángurs close by are the brothers Báju, Dháku, Rama, and Tùká, the surname of all being Akadá. In another family are Kumia, Tùkia, and Bába, with Zora as the name of the clan; the women are called Sawé, Babé, Tùmi, and on marriage become Sawé Akadin, Tùmí Zorín, &c. So with the Thákurs—Hassù, Kalù, Zánù, Dùmá, and Daya are brothers, with the surname of Páradì; and the women, Ùmbì, Sirké, Gomé, Kánì, and Shemré, are called on marriage Umbi Páradì, &c. The Kátkuris, on the other hand, have—now at least, and about Matheran—no distinctive surname, that of the tribe only being added; thus, Rùpa, Honia, Rutnia, Shamia, whether of the same or different clans, are merely Kátkuris; and the women, Paulì, Nábì, and Zánki Kátkurin.

Each tribe has its own dialect, which they use amongst themselves, but they speak Mahratti only to strangers. It is disguised, especially with the Thákurs, by some changes of pronunciation of the vowels and consonants, a nasal twang, and sing-song intonation, that makes it hard to be understood. In this tribe, also, the use of Hindustani words is common, owing possibly to Mussulman influence before their emigration. The primitive language of all is supposed to have belonged to the agglutinative, or compounding class; but, in the few attempts that have been made to write down their songs, or to take notes of their conversation, although many peculiar words have been remarked, the inflectional Mahratti structure has

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always been apparent, and the earlier forms of their original tongue seem to have been altogether lost. The intelligence of all the tribes, if tested in the ordinary way, may appear low ; they cannot tell their age exactly, nor can they count much over twenty without getting confused ; the days of the week they know, but they do not number those of the month, observing only the changes of the moon. In such matters their capacity is feeble, but let them be tried with questions about their trees, the names of them, and the seasons at which they are in flower or fruit, or with inquiries about the wild beasts and the innumerable birds and insects of their jungles, and they will reply with astonishing minuteness and accuracy. Boys even show great readiness ; and the best collector of plants on the hill often brought his wife with him to assist in naming them correctly. Living under the influences of the woods, the people generally have a shy and quiet manner. They are gentle to one another, and crime is so uncommon among them that they give the magistrate of the hill no trouble. Such quarrels as they have they settle among themselves, or lay their case before Madhoo Rao, the old kotwal, for whom their respect verges closely upon worship. The Kátkuris only have an evil reputation ; no one who possesses a fat sheep or sleek goat is safe from their depredations, and this is the usual extent of their evil-doings. They are the only tribe that care to go beyond the immediate circle of their homes ;

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and it is very likely that their habits of seclusion have been broken by enforced visits to the jails of Tanna and Rutnagéri. All the people go unarmed now, the Kátkuris even having laid aside their bows and arrows. A few carry guns by license to keep wild animals in check; and there is an old Thákur living below Maldoongar who well merits the honour, seeing that he has shot over fifty panthers and some tigers besides.

In days not long past, when Bundwallahs were out, the hill people may have suffered at times; but they were quite as ready to join as to oppose when a foray was in prospect; and the names of Paddu Nármál, Kìmia Gaolé, Bhao Keng, and Pùnia Gowaré are still held much in the same esteem by them as that of Rob Roy among Highlanders. Matheran, Prubal, and Bao Malung were favourite resorts of these marauders, whose leaders were mostly of the Kuli tribe, and often, by the stubbornness of their resistance, gave proofs of the same determined valour as have been witnessed among the Waghurs of the present time. The country below was also the scene of those sharp struggles with the Mahrattas, so well recorded in Grant Duff's history,—Prubal, the Stronghold, and Bao Malung, the Saints' Hill, still showing traces of ruined forts; but the former is now deserted, and the latter, a highly castellated peak of imposing beauty and grandeur, which, by its minutely terraced sides and massive form, suggests vividly the outline of

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an Indian temple, is now the resort of peaceful pilgrims, both Hindu and Mahommedan.

The whole chain of the Bao Malung, running from Panorama Point, is a striking feature in the view from Matheran, changing ever with the seasons and with the growing or waning day. It is a spot well fitted for a sanctuary; and as the people of the plains flock to it for purposes of devotion, the better sort of the hill tribes will often join in the "mela" to take their vows at the Hindu shrine; they will even worship at the tomb of the Mahommedan Pir there, and they have been known, without serious scruple, to attend the services of the Roman Catholic chapel at Matheran.

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CHAPTER III.

The Plants of the Hill.

TREES AND SHRUBS.—Unaided by illustrations, even the commonest nature-prints, words are weak to describe these in all their wide variety. Our endeavour will be to present them much as they meet the eye, to say of each what may lead to its recognition, and so to guide such as take deeper interest in them towards the works of Graham, and of Dalzell and Gibson, who have been our chief instructors in the Botany of the Bombay Presidency.

Numerous though they be, there is no species known, either tree or shrub, to be strictly limited to the hill: those having a narrow geographical range grow also on the neighbouring Ghauts, and on the high lands of the Konkan; while a large proportion, not so restricted in their distribution, are common to it and the whole surrounding country. Here as elsewhere, however, their grouping and association are often peculiar, very noticeable on the slopes with increase of elevation, and less so on the various ridges

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and hollows of the summit. Our concern is chiefly with those that clothe the hill-top, and this difference of range and peculiarity of grouping may be taken to serve roughly as a guide in describing them. Beginning with the bushes and smaller trees, it may be noted that there is a Capparis on Matheran that was long supposed to have no other habitat, until it was recently found growing on the hill of Tonghar; and that a species of Croton, to be seen near the Reservoirs, still awaits discovery elsewhere. The latter is rare even here, and has for its main distinction, from some of its congeners, a mammillated seed-vessel; but the Capparis, with small, prickly, pointed leaves, delicate feathery flowers, and single-seeded capsule on a long footstalk, is well known. The "Anjun," again (*Memecylon edule*), has a range from 2000 to 4000 feet of height, and here reaches its lowest limit. It attains at times a goodly size, but is usually a bush, with rough bark on round branches that divide frequently, and bear small shining obovate leaves; the purple flowers are gathered in heaps on the branches, and are succeeded by a little round fruit with one or two seeds.

Along with it, and not unlike it, is often seen the "Ursool" (*Canthium umbellatum*); the shining leaves of the latter, however, are larger, the branches open and spreading, the flowers white, and the fruit obovate. With a range still wider, the tapering, graceful "Pesha" (*Actinodaphne lanceolata*) abounds all over

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the hill-top, and is known by its whorls of leaves at the ends of the branches; they are long and lance-shaped, green above and hoary beneath, drooping like the plume of a cocked hat; the flowers are in short racemes, tawny and silky, and the fruit somewhat like an acorn.

With a distribution nearly the same, follow a number of characteristic bushes or small trees, such as the "Ghela," or *Randia dumitorum*, having crisp, smooth, shining leaves, and yellowish solitary flowers at long intervals on the branches; while its fruit, poisonous to fish and vermin, is in the form of an apple. The "Bhomia" (*Glochidion lanceolatum*), usually low and crooked, with short-petioled shining pinnate leaves; the male and female flowers are separate, and the fruit is puckered into cells like that of the Marsh Mallow. The "Dhindee" (*Leea staphylea*), with a look of the mountain ash, has smooth branches, the young shoots often rising to six or eight feet in height, and straight as an arrow; the leaves are compound, tapering, serrated, and of a beautiful claret colour when young; flowers greenish-white, in large terminal cymes, and fruit a small berry. The stunted "Paput" (*Pavetta indica*), one of the coffee tribe, has coarse leaves, white flowers, which are eaten by the hill people, and clusters of fruit containing seeds that are grooved like the coffee bean. The "Kuray-pak" (*Bergera Kœnigii*), a small erect shrub, with delicate, pubescent, pinnate leaves, smelling of assafœtida

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when bruised, and whitish flowers, succeeded by edible berries. The "Eisur" (*Callicarpa cana*) spreads widely, and has its branches and leaves covered with down, flowers indistinct, and a currant-like fruit that is much eaten by birds. The "Bamun" (*Colebrookia ternata*) is still more downy and woolly-looking; and the broom-like "Ghagree" (*Crotalaria retusa*), with rich yellow flowers and short thick pods, in which the seeds rattle when ripe.

Others not less typical may be added to the list, such as the "Rametta" (*Lasiosophon speciosum*), which along with the "Waitee," a species of Strobelanthus, congregates on Chauk Point, and forms the jungle near the cliff. The Rametta bushes are often seen stripped of their bark, which is used for poisoning fish, and may be known by their small lanceolate leaves, and the hairy, scaly heads of flowers that are peculiar to them. The common "Karvì" (*Strobelanthus asperrimus*) fringes the Panorama and Ghár-but spurs, and in its flowering years makes a find display. The "Aloo" (*Vanguiera edulis*), with wavy bright green leaves, whitish flowers, and narcotic apple. The "Pandrah Koora" (*Tabernæmontana crispa*), a handsome shrub, with dichotomous branches and white dice-like flowers, elegantly contorted and fringed, the fruit arranged two and two together, like horns on the branches.

In much the same places the "Morì" (*Casearia lævigata*) grows; its flowers are also white but plain,

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and the green oval fruit has a curiously-indented kernel. The "Karunda" (*Carissa Carandas*) is a common bush, and yields a very palatable fruit in its season, which may be eaten either plain or bruised in milk like strawberries. The "Makur Limbù" (*Atalantia bilocularis*), or Wild Lime, abounds on the western side of the hill; the flowers are in great favour with butterflies, and of its branches good walking-sticks are made. The handsome "Limbara" (*Heyneana trijuga*), with pinnate leaves, and white, waxy, sweet-smelling flowers; and the "Sajerì" (*Sagaræa laurifolia*), a very ornamental laurel-like bush, may also be named, along with the "Karowtì" (*Ficus heterophylla*), two Crotons (*hypoleucas* and *Lawianus*), and the Rottleras (*tinctoria* and *mammillata*), amongst the prevailing brushwood; some of the last, along with the blue and white Barlerias, being found only in the neighbourhood of springs.

Among larger trees, occupying for the most part the higher ground, are the "Phunsee" (*Carallia integerrima*), which has straight branches spreading out like those of a pine, rough bark and thick polished leaves; the flowers are small, almost sessile, and the fruit resembles a cranberry both in size and taste; the section of its wood is peculiar, showing, along with the concentric rings, rays diverging from the axis. The "Kokum" (*Garcinia purpurea*), or wild mangosteen, resembling the last in its general appearance, but the clove-like flower, and the large pulpy

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fruit, of which a sherbet is made, distinguish it readily; it is rare on the summit, but grows more plentifully a little way down on the western slopes of the hill. The "Kanta Koomla" (*Sapota tomentosa*) is a thorny, plain-looking tree, abounding everywhere on high ground, and known by its small oval leaves, that are bluntly acuminated in form and tawny when young; it has dull white flowers, and fruit like an olive, containing two or three richly-coloured seeds. It is often covered with the common Dendrobium, and a Loranthus also grows upon it, whose soft creeping stem is so buried in the bark that the leaves appear to grow from the trunk of the tree. The "Tsandia" (*Macaranga Roxburghii*) is equally common; the large light green heart-shaped leaves, having the leaf-stalk inserted within the base, are used as drinking-cups; the flowers are in short panicles, and the fruit round like a pea; it is covered with a waxy secretion, which spreads also over the smaller branches, and, by checking exhalation, keeps the leaves ever fresh and green. On the bare laterite plateaux the "Warus" (*Heterophragma Roxburghii*) seems to grow by preference; it has round branches that divide into minute ramifications, pinnate leaves, and the flowers are in panicles, white or tinted with pink, and finely fringed; the fruit is a quadrilocular pod about a foot long, and has the papery-edged seeds lying compactly within it. The "Mullya" (*Diospyros nigricans*), a species of ebony, very handsome, and occasionally a large tree, is in

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many places; it has a dense foliage of smooth oblong leaves, and the female, for it is dicœcious, bears a fruit the size of an acorn, within which the seeds lie imbedded in gum. Another species of the same genus, the *Diospyros goindu*, much smaller than the last, occurs scattered about in the same way. The "Gùlum" (*Màchilus glaucescens*) is so rare that only three trees of the kind are known, but they are among the finest on the hill; it has large laurel-like leaves, small yellow flowers, and a round fruit rather larger than a marble. Vying with it, and having leaves still finer, is the *Xanthochymus ovalifolius*, also rare; its branches are angular, and it has a purple fruit the size of a pigeon's egg, from which gamboge exudes when it is cut. These, with the "Phunnus" (*Artocarpus integrifolia*), also seen in a few places, have the most magnificent foliage to be met with in the woods, and in all three it is much alike. The "Lullei," again (*Albizzia stipulata*), is equally distinguished by its grandeur when in flower. It occurs plentifully in particular localities, and when in its full glory, in the month of May, forms a striking object in the landscape. The tree is not lofty, but of great breadth, and the mimosa-like leaves droop most gracefully from the far-spreading branches; they have a purplish tinge when young, and mixed with them are the rich tassels of fragrant flowers, white below, delicately rose-tinted above, and tipped with brown pollen. They load the air with their perfume, but soon fall, and

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are replaced by papery pods that hang long to the branches.

Passing now to those trees that, though numerous on the hill, spread also towards the plains and throughout the country, may be mentioned the "Ain" (*Terminalia glabra*), which furnishes a useful wood. The "Hìrdì" (*Terminalia chebula*), which, though not found in many places, is the prevailing tree on the western side of Ghárbut. Its foliage is very close, and the small greenish-yellow spikes of flowers remind one of the English lime: like it, too, it is a favourite of the bees; the fruit is oval, of a purple colour when ripe, and full of tannin. The "Asauna" (*Briedelia montana*) is thick and short in the stem, and on barren soil has very thorny branches; the leaves are smooth, narrow, and prominently veined, and in their axils rests the small round fruit. Of a fine flowering family, but itself quite plain in that respect, the "Nania" (*Lagerstræmia parviflora*) is often seen, and nearly always singly. Its outer bark is loose and broken; leaves oblong and pale beneath; the flowers are white, and the sound black seed-vessels hang long to the tree. Scattered about also, and rarely in clumps, the large and rough-leaved "Kurmul" (*Dillenia pentagyna*) is common. It has yellow flowers, about half an inch in diameter, clinging closely to the branches, and a scaly fruit the size of a filbert. Of like distribution is the "Kùmbia" (*Careya arborea*), the large leaves in tufts, smooth and wavy, flowers of a dull

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white on short spikes, and fruit somewhat like a crab-apple. Here also the "Aupta" (*Bauhinia racemosa*) may be named, having leaves folded and erect, like the wings of a butterfly. The "Pullus" (*Butea frondosa*), noted for its orange-red flowers and the ruby-coloured gum that exudes from its bark. The "Kurpa" (*Cupania canescens*), one of the soap-tree tribe; the "Chaùra" and "Bùrumb" (*Erinocarpus* and *Nemeora Nimmonii*); the strong-smelling "Guera" (*Mappia oblonga*); the "Aouli" *Phyllanthus emblica*), having fern-like leaves, and a fruit resembling the sooparee, which is used as a pickle, and in the treatment of land-scurvy; the "Bawa" (*Cassia fistula*), with drooping yellow flowers like those of the laburnum; the "Pangarah" (*Erythrina indica*), the wood of which is in demand for making drums; the "Sagurgota" (*Cedrela toona*); the "Goldar" (*Sterculia guttata*), and many others, of more or less note, too numerous to mention.

The Fig-tribe is fully represented on the hill, and everywhere prevalent. The "Oombur" (*Covellia glomerata*), with its mossy trunk often bearing orchids, is familiar; it is remarkable, more perhaps than any other, for the coolness of its shade—the brighter the sun, and the more parching the wind, the more grateful the shelter it affords, as it seems to act the part of a natural "*Tatti*," exhaling moisture abundantly. There are some of great size, and one on the northern slope of the Panorama ridge that measures fifty-two feet in girth close to the ground; it divides, however,

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at once, and the branches have the dimensions of large trees. About the same spot, as well as on all parts of the hill, the "Ashta" (*Urostigma religiosum*)—the old Ashwattha of the Vedas—abounds. Wherever there is level ground and soil of "*Kala Mutti*,"—which is not necessarily the decomposed black rock, as its name might imply, but derived from the laterite also, its kaolin completely reduced, the iron washed out, and its dust mingled with vegetable mould,—there the "Oombur" may be seen on the level, and the "Ashta" clinging to the rocks around. The latter is very like the "Peepul," if not identical with it. The "Paìr," again, or *Urostigma cordifolium*, is quite a different looking tree, and, like the "Nandrook" (*Urostigma retusum*), only occasionally finds its way to the summit, whereas the "Ashta," as the names are applied at Matheran, is all over the hill and in its most central parts. There appears to be some confusion, however, in the nomenclature, and the "Ashta" may prove to be *Urostigma cordifolium*, while the "Paìr" is *infectorium* or some other species.

The "Kùsimb" (*Schleichera trifuga*), and the "Kurgol," or "Kapsì" (*Sponia Wightia*), as well as the Dhaitì, Hela, and others, also descend towards the plains; but the most conspicuous of all those that are common, both above and below, are the "Parrjamb" (*Olea dioica*) and the "Jambùl" (*Syzygium jambolanum*). The former, or wild olive, is often a large tree; its leaves are dark green, serrated, and acute at both

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ends; the flowers are in panicles, and the fruit a small drupe in thick clusters; the bitterness of the last is intense and lasting as that of quinine, but is supposed to be owing to the presence of a bitter extractive and not of an alkaloid. It ripens about the same time as the Jambùl, and a common trick of the hill Tattoo-boys is to present their big brothers from Bombay with a handful of the two mixed. No harm results; but the wry faces of the victims, and their rage at the deception, afford excellent sport to their tormenters, who will be seen grinning from behind a tree beyond the reach of chastisement.

The Jambùl is so prevalent on all parts of the hill that it seems by no means unlikely to have covered, with a few others, its whole surface in times past. Some old patriarchs, with skeleton branches and small hard leaves—the grey hairs of trees—still hold together in patches, and may have formed part of the primitive forest before it was disturbed by the hand of man. However this may have been, many of later generations are now large and stately trees, much valued for their welcome shade, their useful wood, and a fruit that is relished by man, and bird, and beast. The rich hues of the young leaves of this tree, of those of the Mango too, which is equally diffused, and not less of the Dhindì, Lullei, and many more, cannot fail to attract admiration—they tint the whole foliage of the hill almost as vividly as the home woods are coloured by the decaying leaves of autumn.

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In riding up from Narel, the Jambùl is a conspicuous tree the whole way; but it is interesting to notice how many others disappear from the roadside as the heights are attained. The large white-barked and naked-looking *Sterculia urens*, for instance, common about Narel, is no longer seen above the Mango Tope. The *Bassia latifolia*, from the flowers of which the mowra spirit is distilled, drops off at the same spot. The *Tectona grandis*, or teak, is the most numerous tree in the forest below, but ceases to grow about the first bend in the steep Ghaut. The *Salmalia malabarica*, or silky cotton-tree, ascends higher, and some of its allies, frequent on the sides of the hill, in smaller numbers reach the summit. The *Hymenodictyon excelsum*, or bastard Cinchona, a goodly tree half-way up, dwindles to a bush at the top; and so with the *Caryota urens* and the Khair tree, that form belts of jungle at their own elevation, and only appear as stragglers beyond it.

There are many climbing, creeping, and parasitic shrubs on the hill, "Yèils and Bandolas," as they are called, and in the older forest they twine and twist in the most inextricable confusion. One of the commonest is the "Koosur" (*Jasminum latifolium*), having delicate, light-green, pointed leaves, rough bark, and white fragrant flowers, followed by a black berry. Equally so is the "Watyeil" (*Cocculus macrocarpus*), with smooth uniform leaves, panicles of flowers hanging from the stem, and cream-coloured fruit in

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bunches. The "Chickakaì" (*Acacia concinna*) is in many places by the roadsides, and, with the recurved thorns on its spreading branches, frequently entangles the passer-by; it has little balls of yellowish flowers, and curved pods that the ayahs are always gathering for washing their hair. The "Toorun" is equally a wait-a-bit thorn; the rough leaves are the favourite food of the Attacus caterpillar, and the white mealy drupe is much eaten in its season. The "Wagatì" (*Wagta Spicata*) is another climbing, armed shrub, often seen with orange and red flowers, and the legume like a string of beads. So with the "Ragì" (*Mezoneuron cucullatum*), which has its flowers in long, stiff racemes, and the compressed seed-vessels hanging in tufts; and the "Kanwail" (*Ventilago madraspatana*), with leaves entire when young, but serrated as they grow old, branches long and leafless, and the flowers in panicles. The "Wakèrì" (*Rourea santaloides*) is a rare plant in the neighbourhood, and occurs only much further to the south; it has small coriaceous shining leaflets, not unlike those of the sandal-wood tree, with flowers in panicles, and a small ovoid pointed fruit; it seems that the *Cæsalpinia paniculata*, not uncommon in the Konkan, sometimes goes by the same name. The "Yéowtì" (*Hippocratea Grahamii*) covers a wide space with its smooth, spreading branches; it has minute pale green flowers, and the

ssels usually three together, and over two

ng and one wide. The "Lamtani" (*Anoden-*

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dron paniculatum) is remarkable for its huge, shining, laurel-like leaves on dark-coloured branches, yellowish-green flowers, and pairs of seed-vessels four inches long. The "Kaoli" (*Gymnema sylvestre*), like the last on a small scale, but the branches are pale, and the seed-vessels, though joined also at the base and in pairs, are indistinctly three-sided instead of being round and smooth; the name is not very strictly confined to the Gymnema, but is applied also to the Cryptolepis and other milky shrubs nearly allied to them. The "Wooksi" (*Getonia floribunda*) often assumes the habit of climbing; it is a coarse-looking downy-leaved shrub, with balls of faint green flowers. The "Yek-yeil" (*Dalbergia sympathetica*) has strong hooks on its branches, small acacia-like leaves, whitish flowers, and thin pods; it is spread over the hill, and is often seen when in flower covered with butterflies. Near the springs are the "Tsapyeil," a species of Canthium with polished leaves, flowers having a reflexed white corolla and smelling sweetly, and a black fruit; and the "Tsamberyeil," or *Premna scandens*, which has large coarse leaves widely scattered on the branches, and obscure flowers in corymbs. Others have been collected, as the *Uvaria narum*, with solitary brick-red flowers over an inch in diameter; the "Datir," or climbing fig (*Urostigma volubile*), &c.; but they have been either from below, and so no notes of them taken, or perhaps seen so rarely as to have been forgotten excepting by name. A few, however,

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quite familiar, have still to be noticed: they are the sweet pea, *Phaseolus sepiarius*, so universal after the rains, which is as fragrant as its namesake; the "Parel" (*Cyclea peltata*), common on the trunks of trees, having triangular leaves and clusters of cup-shaped flowers; the "Koolti" (*Tragia involucrata*), an obscure little plant, but too well known by the sharp sting of the hairs that cover it; the *Piper sylvestre*, that clothes many rocks and trees; the "Ambùgli" (*Elæagnus kologa*), often seen without any pretensions to climbing, but more frequently throwing out shining, scaly tendrils which hang in leashes, bearing leaves smooth above and silvery below, and a white ovoid fruit, occasionally used as food in hard times. Last of all is the "Kordor" (*Ancistrocladus Heyneanus*), which grows to a height of four or five feet, and is crowned with leaves of a deep green, long and tapering towards the stalk, before it begins to climb; tendrils are then thrown out on which hooks afterwards form; the leaves are in clumps, and among them are seen small racemes of white flowers finely tinged with red; the petals are fleshy, five in number, and overlap each other, the stamens ten, alternately long and short, and the stigma tripartite. When the flowers fade the calyx remains, and the seed enclosed by it is quite undeveloped; enlarging gradually the sepals extend into long wings, usually three in number, though originally five; the growth goes on for two months, and by degrees the radicle of the young

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plant becomes distinct from the cotyledons, and the seed then falls to the ground.

The Loranthus family are the common parasites of the hill; they have a wide range for the most part, and are seen clinging to the trees both below and above; they are called Bandolas, or Bindùklìs, by the natives, and they seem to have no separate names for the several members of the family. *Loranthus longiflorus* is the most abundant; the leaves are light green edged with red, and it has a long funnel-shaped slightly curved greenish flower. *L. loniceroides*, not unusual on the Jambùl tree, has flowers shaped like a claret-jug, one segment being recurved that represents the handle. A rare species has thick succulent leaves sessile on the jointed branches, and flowers, much like those of the last named, in fascicles round the joints; it appears to be the *L. elasticus*. Very unlike the others, but in some places, as at Chauk Point, quite common, the *L. lageniferus*, having broad, fleshy, roundish leaves, and a red flower that appears in the rains, is seen clinging to the sapota tree, and by its close embrace often destroying it.

FLOWERS AND FERNS.

The numerous shrubs in flower after the rains, and especially those of the Acanthus family, which, as noted by Hooker, has a habit of blossoming in the cold weather, are more attractive to the eye, perhaps, than the herbaceous plants, but everywhere on open ground

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the yellow composite *Verbesina biflora*, the "Sùnkì" of the hill-people, and the tall purple "Teerda," a name applied to the whole race of Balsams, give colour to the October landscape. All the latter belong to the genus Impatiens; *balsamina*, *tomentosa*, *Kleinii*, and *oppositifolia* being common, and the handsome *rivalis* extremely rare. The last fringes the margin of the black rock while it is still wet in several places, but soon withers away; it has broad, fleshy, radical leaves, and a large irregularly cut corolla, from the cup-like centre of which issues a curved spur over an inch in length, and all of the rich colour of the sweet pea; the seed-vessels roll up like a spring on bursting, a property common to the genus, and that gives it its name. In great profusion also are the two species of Cynoglossum, *cælestinum* and *glochidiatum*, not unlike the forget-me-not in the form and colour of their flower, but larger and more straggling in habit; they are called Nìsùrdì by the natives. The "Kurrù," again (*Cucumis trigonus* and *pubescens*), cover with yellow blossoms the long stems of the "Karvì" as if trained over them by the hand of man; and the small striped cucumbers, one smooth, the other bristly, hang by long pedicles from the twining stem far into the cold weather. Of the same family are the "Kuondel" (*Tricosanthes palmata*), with large, white, fringed corolla; and a species of Luffa that are comparatively rare. Of the many kinds of Convolvulus, *Argyreia sericea*, having soft downy

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leaves, and flowers in dense heads, and the *Ipomæa campanulata*, of much looser habit, are the most conspicuous. The latter, or "Gowale," winds its way to the tops of the highest trees, and covers them with flowers as if the blossom were their own. The "Aumtì" (*Ipomæa sepiaria*), as the season advances, spreads over the smaller bushes in much the same way, the white and red flowers hanging gracefully, like ear-rings, from the young branches; it has a woody stem, and might have been named among the shrubs. The *Porana racemosa*, or "Bhowrì," known by its small white flowers and long-petioled delicate leaves, climbs also to a great height, while its rosy-coloured ally, the *Convolvulus arvensis*, spreads commonly over the ground.

Passing from the Bindweeds, there are, besides the "Sùnkì," many other Composites, such as the "Bùndar" (*Eupatoria divergens*), with slender branches, carrying numerous heads of purple flowers; the "Downa" (*Artemisia indica*), having alternate deeply-cut leaves on a high straight stem, and the flowers in racemes or panicles; two *Doronicums—reticulatum*, which is common, and *lavandulifolium*, restricted to the north-east corner of the hill. The strong-smelling "Bombartì" (*Blumea holosericea*) abounds on Louisa Point and in all the open glades, where its aroma fills the air when its soft white leaves are trodden under foot. The *Cyathoclyne stricta*, sometimes mistaken for a fern, with its deeply-cut delicate leaves, is found

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under every moist and shady bank; the flowers are purple. *Decaneurum lilacinum* is also in many places, and *Microcephalum*, which smells like chamomile, is rare; they are plain, like their congeners, with hoary leaves, and solitary heads of flowers. The *Sonchus oleraceus* is a common weed; *Gynura simplex*, tall and erect, with widely separated leaves, and flowers of a deep orange colour, is seen occasionally; and *Conyza absinthifolia* is one of the ordinary composites. There are many species of the Acanthus family, and some of them among the most attractive plants on the hill. The "Motyen" (*Lepidagathis grandiflora*), seen only in one place on the summit, whither it may have been transplanted, abounds near the springs that trickle over the black rock a short way down the Ghaut; it has knotty joints on its branches, pointed leaves, and the envelopes of the fine blue double-lipped flowers, streaked with yellow hairs in the throat, are covered with a coating of wool. This and *Justicia Ecbolium*, whose inflorescence is in long, square, tapering spikes, from which the green flowers hang loosely, are very handsome, and both love the neighbourhood of water and the shade of the large trees in the deeper valleys. *Neuracanthus trinervius* abounds on the western side of Ghárbut, near the springs; and *Haplanthus verticillaris* and *tentaculatus* are on the banks around. There and in other places *Blepharis asperrima* again, known as the "Akra," frequents dryer soil; it has a creeping stem

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and prickly bracts, among which the blue flowers rest, and it affords a favourite food to the hares on the hill. In like manner *Asystasia chelanoides* often covers the ground; it has blue flowers also, and the throat of the corolla is spotted with purple. Also, in dry places, may be seen *Eranthemum roseum*, having a strong oppressive odour, and the *Rungia elegans;* both with the blue flowers characteristic of the family.

The Leguminous flowering plants are often more or less shrubby. The sweet pea has been noticed, and along with it might have been named among the shrubs the yellow-flowered *Cylista scariosa*, the *Flemingia stricta* and *strobilifera*, and the *Atylosia Lawii*. *Alysicarpus parviflorus*, however, is herbaceous, attaining sometimes a large size, and handsome form; the bluish flowers hang loosely, and are succeeded by thin curved seed-vessels. There are Desmodiums also, of three or four kinds, but the most striking of the family are those of the genus *Smithia*. There are three species: *setulosa*, in great abundance on Chauk Point, and known by the two red spots in the throat of its rich yellow corolla; *hirsuta* and *bigemina* also clothe the hill densely in various parts as the rains are ceasing, but wither rapidly with the setting in of the land winds.

There is little variety in the Umbelliferæ, although the few species representing them are numerous. By far the most abundant is the *Heracleum Pinda*, the

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specific being also its native name. It is a hairy plant, with white flowers, the outer petals of the corolla being large and two-lobed; the fruit is in thick clusters, and the seed-vessels flat and ribbed; it is aromatic, and used as a pot-herb by the natives. *Helosciadium Heyneanum*, a kind of anise, is found very generally; its flowers drop early, and a smooth roundish seed remains. These and the *Pastinaca grandis*, or Bhaphullì, a kind of parsnip, have only been observed; the last has also white flowers, and the aromatic properties common to the family.

The Labiatæ, after the Balsams and some others have died down, become the most noticeable of the herbs that flower in the cold weather. *Pogostemon purpuricaulis* is in dense masses, and extends in equal abundance to the plains; its leaves smell like apples or black currants when bruised; they are thin and soft, standing out on long stalks from the purple stem, and the reddish flowers are in panicles, both terminal and axillary. *Leucas stelligera* has a fine aroma; towards Chauk Point it is even more plentiful than the "Panglì," just described, and mingles frequently with it there and elsewhere; the stem is hoary, and the white flowers are in verticels about an inch in diameter. The *Anisomeles ovata* is equally abundant; it is known as the "Gopalì," and has toothed leaves, purple flowers, and rough stem all covered with hairs. Two species of Plectranthus are met with: *cordifolius*, which has an erect stem, with

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pale blue flowers in lax panicles, few in number; and *scrophularioides*, in which the labiate corolla assumes more the curtailed form of the family after which it is named. *Striga orobanchioides*, about a foot in height, has an erect purple stem, scale-like leaves, and rose-coloured flowers; it grows in damp ground, and is said to be always parasitic. Along with it, early in the season, are seen *Ramphicarpa longiflora*, with thin thready leaves, and a long-tubed white corolla; as well as *Sopubia delphinifolia*, which has likewise the leaves much divided, but the flowers are of a reddish hue.

Of the Mallow tribe may be commonly seen the *Thespesia lampas*, which is shrubby; a yellow-flowered *Abutilon; Urena sinuata*, with handsome leaves, and corolla rose-coloured; *Hibiscus hirtus*, which has white flowers; and *heptaphyllus*, little seen on the summit, but with its large showy yellow flowers, purple in the centre, conspicuous on the Ghaut.

There are several Amaranths, *Celosia argentea*, with silvery spikes, the bracts of which are tinged with purple; the very common *Achyranthes aspera*, having the spikes arranged in threes, and, after flowering, covered with pointed seeds, that adhere closely to the clothes, and the woolly Aerva (*A. lanata*), being the most abundant.

There are still some plants demanding mention that have been omitted from the prevailing families, or that belong to others, and the list might be largely

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increased. *Adhatoda ramosissima*, a coarse-looking Acanthus, is in great profusion in some places. *Hedyotis latifolia* and *repens* of the Rubiaceæ; *Vicoa indica* and *cernua*, and *Ageratum conyzoides*, of the Composites; *Commelina communis* and *Cyanotis fasciculata*, with tufted blue flowers, of the Spiderworts; the plain and abundant *Urtica scabrella*; *Chlorophytum Nimmonii*, having star-like six-petaled corolla in long spikes, seed-vessels triangular, and the leaves of a lily; *Anguillaria indica*, a kind of Colchicum; *Trichodesmus amplexicaule* and *Zeylanicum*, of the Borage family, both very rough and hairy; *Solanum indicum*, or "Chichùrtì," prickly all over, and with flowers and fruit like the potato; *Triumphetta angulata* and *rotundifolia*, with greenish-yellow flowers and bristly seeds, are mostly common herbs. Besides these, on the wet rocks may be seen growing plenteously the small *Physichilus serphyllum*, having purple flowers and roundish leaves; the common little plant, known as the mud-lover (*Limnophila gratioloides*); and *Ammania floribunda*, also diminutive, and with erect stems, and cordate leaves clasping them, its flowers being of a reddish hue. *Begonia crenata* is also a water plant, and dries up quickly after the rain ceases; while *Bryophyllum calycinum* goes on flowering for a long time in the cold weather. The latter is common in gardens, but found wild only by the side of a small stream on the north-west corner of the Ghárbut ridge; its long tubular red corolla hanging in panicles, and, mingling with

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the "Gowale" and other creepers, then also in flower and full leaf, they arch over the rivulet, and almost conceal it as it falls from the cliff. The leaf of the Bryophyllum, if hung up by a thread in the verandah, will in a few weeks throw out young plants all round the margin, and from this curious peculiarity is derived its very happy name. Near the spot where it grows, and all about the top of the Ghaut, the tobacco-leaved Lobelia, singly or in small groups, is also seen. It has wide-spreading leaves, and spikes of white flowers in full blossom as the hot weather approaches. With the setting-in of the rains appears on all sides the Snake lily (*Arisæma Murrayii*), so familiar to every one at that season; and the *Curcuma pseudo-montana*, whose yellow flowers and rose-coloured coma rise above ground about the same time. The Orchids come later, and have been observed mostly towards the close of the monsoon. The giant species, *Platanthera Susannæ*, is a splendid plant, not uncommon on the Chauk and other spurs early in October. *Habenaria longicalcarata*, with fragrant greenish-white flowers, is more generally spread over the hill; and the small white-flowered *Habenaria candida* is common everywhere. A fourth species, new to the Bombay Presidency, has lately been found, most numerously on the Maldoongar ridge, pronounced by Mr. Dalzell to be the *Habenaria commelynifolia* of Lindley. It rises to a height of two or three feet from the ground, and bears a spike of white helmet-shaped flowers,

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that cover loosely about six inches of the stem. Among tree orchids are the *Æria braccata*, with a large white flower that appears early in the rains, and *Æ. Dalzelli*, that blooms somewhat later; they are, therefore, usually seen in seed only, and not readily recognised. The Dendrobia, however, *barbatulum* and *chlorops*, reserve themselves for the cold weather; they remain long in flower, even when dry, and may be kept in water for six weeks without fading. The former is in leaf during the rains, and is then quite as like the Commelina as the orchid so named; it grows on the "Kanta-Kùmlì" chiefly, sometimes covering the tree with its cream-coloured flowers, more or less tinged with pink. The latter is also without leaves when bearing its flowers, and these are less conspicuous than those of the *Barbatulum;* it grows more on the sides than the summit of the hill. *Ærides maculosum*, the fleshy spotted leaves of which are often seen on the Oombur and other trees, flowers in the rains, and the corolla is said to be rose-coloured and dotted with purple, as seen in the Konkan jungles. To these will shortly be added another fine flowering species, recently brought to England by Mr. Dalzell, the position and name of which he has not yet determined.

Two most attractive little Utricularias (*reticulata* and *orbiculata*) have been found; their delicate colours, blue and white, shewing prettily among the grass, or alone on the black rock. The rare *Burmannia triflora*

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has rewarded careful search on similar ground ; it may be seen along with the last, but more commonly alone. Like them it has a delicate stem from two to four inches in height ; but while theirs are naked, that of the Burmannia has, in perfect specimens, three or four diminutive leaves embracing it at intervals. It is occasionally branched, and the purple flowers, modest as the violet's, with yellow anthers resting in the white-fringed throat, vary in number from one to five. These, with the two richly-coloured Gentians, *Exacum pumilum*, and *Canscora diffusa*, gay and cheerful-looking at the end of the monsoon as their allies by the edge of a glacier ; and the equally attractive *Sonerila scapigera*, that no botanist has yet seen growing, with *Elatostemma oppositifolium*, *Linum Mysorense*, an Ericolor, a Scirpus, and other creatures of the rains, form, more or less mixed, as rich a carpet on the scanty soil covering the black rock as ever adorned an English meadow.

The grasses require further attention, but among the hay in common use may be noticed two species of Ischæmum, *Anthisteria ciliata*, *Uniola indica*, *Panicum montanum*, *trigonum* and *brizoides*, *Chloris barbata*, a species of Apluda, and some of the rarer genera that have yet to be examined. The soil of the hill is unsuitable for them, and the hay grown hardly worth the cutting. On the levels only they become luxuriant, but the best fodder is mostly brought from below. Some large and coarse grasses, as the "Kuskus," *Andropogon muricatus*, the sticky and prickly

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Andropogon murtini, from which a grass oil is obtained, *Arundinella gigantea*, and the "Chìrka," with its deeply channelled leaves, grow about the crest of the hill and fringe it with a thick border; while the *Coix lachryma*, bearing the hard seeds known as Job's tears, is both on the sides and summit. No Bamboos come up so far, but a Calamus grows near Hart Point, and a Cyperus, with its loose inflorescence, is common.

The Ferns are most luxuriant in October, and in all shady places retain their freshness until the land winds set in. There are not many kinds, hardly a third of the varieties seen at Mahabaleshwar and on the higher hills, while not a single species is known to be peculiar. Some, as the common Brake, are only in one or two localities, the elevation being barely sufficient for it; and others, as the climbing Lygodium, coming up from the Konkan, find their highest limit here in the neighbourhood of the springs and the nullahs leading from them.

The Sagenias are the most conspicuous of all, both from their size and number. The specific name of Hippocrepis is believed to have comprised the whole at one time, but Major Beddome has distinguished three species—viz., *gigantea*, *pteropus*, and *coadunata*, of which the last is the common one at Matheran. No opinion can be formed as to the relative frequency of the others without further search, but, judging from figures only, they appear also to be on the hill. *Pteris aquilina*, our own homely Brake, is found on the

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north-east corner of Ghárbut, and again near the end of the Chauk spur. It grows luxuriantly to a height of five or six feet by itself in the latter situation, and forms a thicket in the former, along with the Sagenias and other kinds. *Pteris quadriaurita*, again, is in many places and of all dimensions, from the merest pigmy to several feet in the length of its frond. *Pteris pellucida*, so named from its polished surface, has the veins in its large tapering fronds running in parallel lines, and the fructification clustering on their edges. It is found in various localities, but most plentifully on the shady slopes about Elphinstone Lodge and the adjoining springs. The Silver-fern (*Cheilanthes farinosa*) is on every bank, usually rather stunted in its growth ; but when the soil is good and water near, its fronds, green above and silvery beneath, attain a good size and spread freely. There is a dark variety which is rare, and that may be the Copper-fern (*Cheilanthes Dalhousiæ*), if it comes so far south. *Adiantum lunulatum* is the common Maiden-hair, in which the spores appear in half-moons on the edges of the long drooping fronds. It varies much in appearance, and frequently the tips are fixed in the ground. In this way graceful little arcs are formed by the fronds, which are always barren when thus taking root in mossy banks. *Adiantum caudatum* and *Capillus-Veneris* are found on hills not far off, but have not been recognised here. Close to the springs in the Bund Valley, and in many well-shaded nullahs, *Pœcilopteris virens* abounds. It

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has been gathered near the Malet springs at least six feet in width, and with a dozen fine fronds bending gracefully to the ground, and a long erect abortive one carrying the fructification. The root is frequently fixed on a bare rock, and it is remarkable how often the fronds are proliferous, that is, little roots form near their tips, and a young fern springs from the spot. The large *Nephrodium molle*, with double symmetrical rows of seeds, is found near the Sunkersett and Ponsonby springs. It is rare here, though so generally spread over the world; and *Nephrolepis tuberosa*, a small rock or tree fern, with sharply cut fronds, the seeds resting in the angles, is also seen but in few places. *Athyrium Filix-fœmina* is common, but unless it be near water soon withers away. *Athyrium Hohenackerianum* is still more abundant, and also dependent upon moisture; but *Athyrium falcatum*, stout, and heavily seeded, is more persistent, and, though rare comparatively, may be gathered till November. Only one Asplenium, the *planicaule*, is distinctly made out, but probably others will be found. On trees and damp rocks is seen *Pleopeltis membranacea*, a foot or more long, and one or two inches wide; it withers immediately on the cessation of rain. *Pleopeltis nuda*, or Wightiana, on the other hand, retains its freshness far on in the dry weather, and its curly fronds readily revive in water. *Acrophorus immersus* has been found growing along with *Remusatia vivipara*, a sort of Arum, on the Ghárbut spur. It has not been

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seen elsewhere on the summit, but as it is common at Khandalla, is likely enough to be indigenous; only, there is some ground for suspicion that it and some others may have escaped from gardens in which alien ferns have been cultivated for a few years past. Near the Malet spring, *Niphobolus adnascens* was seen before the tank was built, but has disappeared of late; and not far from it *Lygodium flexuosum*, with palmate, nearly pinnate fronds, and the seed on spikelets issuing from the edges, has been found twining among the bushes. No others have been distinctly made out, but there is said to be another species of Pœcilopteris growing on the rocks that crown Mount Elphinstone. The barren frond of an Athyrium found on Ghárbut many years ago has led to the most careful search being made for a fruitful specimen of the same, but without success, and a small Ophioglossum reported to be on the trees has hitherto eluded observation on the hill-top. No note has been taken of the moss, mushroom, and other tribes of lowest organization; but all who have gathered either flowers or ferns will know the elegant little *Lycopodium miniatosporum*, that nestles everywhere in the crevices of the rocks.

Little can here be added to what is already known of the economic and medicinal value of the plants that clothe Matheran; but that these are considerable may be learnt by a perusal of the works of Dalzell and Birdwood on the botany and the vegetable products of the Presidency, and by reference to the new Indian

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Pharmacopœia, wherein are named as useful medicines numbers of the plants that grow here naturally, and many more nearly akin to them and possessing like properties. Now that the Cinchonas are cultivated on the hills, Ipecacuanha in the valleys, and Colocynth, Henbane, &c., in special gardens, there seems to be a hopeful prospect that many more plants may be brought under culture in India; and that her wants, now met at a heavy cost and with much loss, may hereafter be largely supplied by the local growth and preparation of medicines.

As ornaments to a garden in a warm climate, or to a hothouse at home, a number of the plants of Matheran would take high rank; and it was with glad surprise that so many of them were lately seen growing under cover at Kew. In the presence of such forms of vegetation as are seen there, it may raise a smile to say that the plants of so small a hill would fill and grace a hothouse by themselves; but to those who have seen such trees as the Lullaî, the Kûmbia, and the Bawa in flower, the Phunnus, Gûlum, and Mullya in leaf, and the Limbara, Pandra kûra, and Sajerî both in leaf and flowr; to those who remember also such climbers as the Kordor, the Tsapyéil, and the sweet pea among shrubs, or the Gowalé and its allies among herbs, the ground flowers and the orchids, ferns, and water-plants, the claim will not appear extravagant. A rockery of the last, with spray falling on it, would form a picture not easily matched either in art or nature.

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CHAPTER IV.

The Animals of the Hill.

MAMMALS.

ALL the larger animals are driven from the summit of the hill by the heavy monsoon, and it is not till "the Elephanta" has cleared the atmosphere that the dead silence of the forest is broken by the cheerful sounds of woodland life. Denied from the same cause a permanent home, few of the mammalia are seen at any season; but the booming cry of the Hùnaman, or Entellus monkey (*Presbytis entellus*), may be heard in the deeper valleys before October is out. Its grave and melancholy black face, encircled with white, will often catch the eyes as it sits on a tree by the roadsides; and at daybreak, or towards evening, a pair of them, or a whole troop, may be seen crashing through the higher woods, or squatting solemnly on the cliffs around. The smaller Macaque, again, or bonneted monkey, the *Mecacus radiatus* of naturalists, is much less shy

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and retiring in its habits. They frequent the whole circumference of the hill, going little into the depths of the forest; and a favourite post is an overhanging tree about the Points, from which they peep and chatter when any one approaches. The names here given may prove to be incorrect, for the only Wanurù ever handled was one shot by a sailor-friend, and carried home in triumph on his own broad shoulders. The lowest-caste Mahratta refused to touch it; and, as there was no Kàtkuri at hand to take it to his larder, it lay long unburied, and might have had all its markings minutely noted. Writing from memory, they were more those of *Presbytis priamus* than of the true Entellus; and, from all that is known of the distribution of the species, it might be either of them. The Macaque is also near one extremity of its range here, being replaced to the north by its ally, the *Inuus rhesus*, which has a longer face and a shorter tail, and is not supposed to frequent the hill. What doubt exists might any day have been removed, but no one who has watched the piteous looks and child-like movements of a wounded monkey, would willingly fire on them merely to gratify his curiosity. No other members of the family, nor any representative of the Lemurs, to whom the monkeys take kindly as play-fellows, are met with at Matheran; for although the *Loris gracilis* is said to have made its way from the south towards the Satpùra hills, it appears to be unknown here. Not many kinds of Bats are seen, but

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several of the family are in great numbers. The ordinary one that skims about the rooms in the evenings in pursuit of insects, often flapping its wings in unpleasant proximity to a lady's head-dress, is a Scotophile, having no face appendage, nor any of the ugliness and oddity of some other genera. This, and the *Taphozous longimanus*, a much larger bat that keeps the open air, never coming within doors, are the most abundant; and circling about alone, or in the company of the others, the pretty little *Kerivoula picta*, that is said to conceal itself in the leaf of the plantain, may be occasionally seen. By far the largest of the family is the *Pteropus Edwardsi*, or flying fox, having a plain face, and the expression of an ordinary quadruped. They live altogether on fruits, those of the Jambùl and Parrjamb being in special favour with them. The ripening of these is their harvest-time on the hill, and they enjoy it amid wrangling and riot that is highly entertaining. The hubbub goes on for an hour or two after dark, but often much longer, and at last, with cheek-pouches full of fruit, and wings wrapped round them like a cloak, they hang themselves by one foot from the branches, and feed at leisure. Perhaps the Parrjamb having such bitter fruit is only used as a perch, but under both trees the ground in the morning is deeply stained with juice, and strewn with the seeds they have disgorged while feeding. The Portuguese look on these Bats as choice food, and the servants of that race allow as much, only rather shyly, as if ashamed

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to own to a taste that to us appears barbarous. The Insectivorous Mammals are represented by the Musk-rat, either the common *Sorex cærulescens* of the plains, or an indigenous species very like it, and with precisely the same odour. A curious peculiarity in its mode of carrying its young has been noticed that may be known to naturalists, but that, even in the most recent works, has escaped mention. On entering a godown one day, that had been shut up during the rains, an unnatural looking creature about a foot-and-a-half long, like a monster millipede or a hairy snake, was seen crossing the floor with the motion of the latter. A blow with a walking stick severed it in two as it made rapidly for its hole. One half entered and escaped, and on lifting the other, it proved to be a couple of infantile Musk-rats, still holding together, though killed by the blow. No Hedgehogs have been found on the summit of the hill, nor any other of the shrew family, although further search, guided by the flood of light thrown on the history of these animals within the last year or two, and gathered to a focus in the interesting work of Dr. Jerdon, may yet lead to their discovery.

Of the large Carnivora, the panther, *Felis pardus*, is common, and much consternation is caused at times by its unwelcome presence. It does not actually make its abode on the hill, but comes up towards evening from the ravines below, commits its ravages either at once, or more commonly in the dead of night, and

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disappears towards daybreak. Their favourite places of resort are on either side of the Panorama ridge and below Maldoongar, in the course of the nullah leading from the Malet springs. One has been met face to face on the path leading to Echo Point, and there is no part of the hill quite safe from their intrusion; but it was in the places first named that the great majority of those that have been shot of late years were found, and the old Shikari, whose pluck and daring have been already recorded, has slain nine-tenths of them. The only tiger killed for some years past was shot in the same nullah; but they too stray at times over the hill, and about the beginning of the hot weather, when the springs are failing, and the place comparatively deserted, the chances of meeting one or other in secluded places where cattle are feeding may always be counted on. Fortunately they seldom make an unprovoked attack on any human being, and there is no instance on record of their having done so since the hill was occupied. The spots on the skins of the panthers found here present, as elsewhere, a marked variety; but it is still a mooted question whether this is sufficiently decided to warrant a distinction of species. The smaller and brighter-coloured race is also the rarer, so much so, that of five or six killed annually for a series of years, only two or three of the whole were thus strongly distinguished from the others. In all panthers, however, there is one feature of the spots constant and noteworthy—it is, that the tawny colour

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of their centre does not grow paler, as the skin in general does, with increasing distance from the spinal column. No Bears have been seen on the hill of late years, but the Hyæna makes its lair there more frequently than the Panther, although, from its skulking habits, it may not come so frequently into view. In rocky parts where they have found shelter, the spots are often marked by the heavy and offensive smell of the animal, and its weird cry, as well as that of the Jackal, may be heard at times, though neither of them frequently. A large wild-cat comes about the Bunds, and on moonlight nights may both be heard and seen there. It is the *Felis chaus*, that is common throughout India, and reported to be a creature of extraordinary ferocity. A dead one picked up on Chauk Point had all the markings of the pure breed, the colour being yellowish-grey, with dark bands along the back and sides, short and ringed tail, a broad head on a long neck, and the limbs also long and powerful. The domestic cat was introduced by Captain H. Barr, and multiplied rapidly. There may be cross-breeds also, but the Chaus is the true wild-cat of the hill. There are several varieties of the mungoose, *Herpestes griseus*, the common one being in great numbers. A much larger and finer animal is often seen crossing the footpaths in quiet places, probably *Herpestes vitticollis*, which is found all along the Western Ghauts, but whose habits are not much known, owing to the difficulty of observing them in such impenetrable jungle.

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The ringed hair of the tail, black, chestnut, and white, is very beautiful. Among Rodents, it would seem that the Porcupines, once known on the hill, have entirely disappeared, not a single quill having been picked up for years past. The Squirrels are of three or four kinds, *Sciurus Elphinstonei*, the Bombay red squirrel, being much the largest. It is very shy and rarely seen, disappearing, after a timid glance, in the twinkling of an eye, and giving little opportunity of noting its habits. The hue of its fur on the back appears darker than is usual with this species, but, from the locality, it is more likely to be this race or variety than either of its allies, *maximus* or *malabaricus*.

A small brown or olive-tinted one, with indistinct stripes on the back, is also rare; its size is nearly that of the Palm squirrel, which is as abundant here as in the plains, and they have occasionally been seen feeding in close proximity. A glance of a fourth species with a white breast, longer in body, but with a less bushy tail than the two last, and not striped, has been obtained several times, that may turn out to be *Somacrourus* on closer inspection, or possibly a Tree Shrew, if they are ever found so far to the west.

Rats and mice are perplexing to the naturalist from the number of their species and their frequent variations. Several are said to interbreed freely in confinement, and it would seem as if they did so in the jungle also, which would account for the difficulty of distinguishing them. The Bandicoot is the largest of all, and not

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uncommon ; it is very destructive, burrowing under the walls of outhouses, and causing them to fall in the rainy season. Temporary bungalows are no protection from them, as they can tear in pieces in a few minutes the toughest karvì with their long green-and-yellow teeth. One caught in a spring-trap carried it away with it into the jungle, and must have gnawed its foot off to get free. As if made savage by the loss, it returned for a while night after night, tore through the godown, and carried away potatoes and other stores that it fancied. At last it took a dose of phosphorus-paste that was laid for it, and was shot while drinking from a *mutka* in broad daylight. The hill-men thought the Ùd or tree-cat only could have riddled the walls with so much ease, and were astonished to learn it was only a Bandicoot wanting a forefoot. The light-coloured house-rat, which also has its abode in the jungle, appears to be the *Mus rufescens*. It is rather a pretty creature as rats go ; has large eyes and ears, and takes a pride in keeping its white paws and belly unstained by the red dust. *Mus decumanus*, the cosmopolitan brown rat, and *Mus rattus*, as the evil-looking and impudent black rat of Europe is quaintly called, have also found their way here, and, with *Mus urbanus*, are the common *Muridæ*. They do much damage to houses, and to them, or some field variety not yet recognised, may attach the blame of making those dangerous holes in the roads, scooped out in a single night, and large enough to admit a horse's foot,

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from which accidents now and then occur. A number of Hares frisk about the open glades in the evenings, and feed on the akrá, a small rough-leaved acanthus that abounds in the rocky nullahs. It must be the *Lepus nigricollis*, although memory, always so treacherous where accuracy of description is needed, retains no impression of the large nuchal black spot which gives this species its name. This and the Bekré or Kitkitta, so called from the noise made by the fetlock joints of the male in its first springs, are the only game mammals fit for the table. The *Cervulus aureus* or Bekré has also many other synonyms, and is very commonly known as the Muntjac; it is a pretty little animal, of a bright rufous-bay colour, whose sharp cry is often heard in the neighbourhood of gardens, to which, like the hares, they are very destructive. Their feeding time is at night only, and in the early morning they will frequently be seen singly, or mother and fawn together, tripping across the roads on their way to the thick jungle, in which they conceal themselves during the day. Another animal, bearing the same name of Bekré or Junglì-Bukra, common in the Nerbudda Valley and about the Ghauts, the four-horned antelope or *Tetraceros quadricornis*, is also said to have been at one time here. None have been seen of late years and even the little Pìsora or *Memimna indica*, that was well known, has, along with other timid creatures, withdrawn from the summit of the hill since

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their seclusion was destroyed. A Sambur has been seen to cross the Ghaut road and trip down the steep bank with the speed and lightness of a goat, and all round in the neighbouring valleys are mammals of many kinds worthy of note. They are, however, beyond the limits of our present history, which is concerned only with those one may chance to meet while roaming about the woods on the hill-top.

BIRDS.

With the clearing away of the wrack of the monsoon comes also "the time of the singing of birds;" and although there are none that can compete in song with the very foremost of English warblers, yet the calls of the Orioles and Barbets, and the homely notes of the Thrush and the Robin, add charms, both new and old, to the woods around.

The birds of the hill much exceed the mammals in number and variety, as might have been anticipated from their greater powers of locomotion and wider geographical distribution. A Swift, for instance, might travel all the way from the Vingorla Rocks in the early morning, hunt the whole day on the wing around the cliffs of Matheran, and return to its nest ere the night was far spent. This seems a startling statement, but is nevertheless quite within the truth; and hardly less surprising, as illustrative of the range of birds over the earth's surface, is the fact that the grey-and-yellow Wagtail, to be seen

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tripping gaily about the Bunds, is in species identically the same little friend whose trim and tiny figure is so familiar to us by the river banks at home. Any description of the birds here must therefore include numbers that are common to all parts of the country, and some that are met with the whole world over; but, as was noticed of plants with reference to the botany, so also with these—there is a grouping and association of species that is characteristic of the local ornithology. The great work of Dr. Jerdon has been our guide throughout; into it has been gathered nearly all that is known of the birds of India, and, to facilitate reference to it, his nomenclature and arrangement have been closely followed.

The birds of prey are well represented on the hill by the large ungainly vultures that may be seen striding awkwardly and indolently on the ground, or circling in the air along with kites and eagles. In earlier days they were almost unknown, but appeared with the butchers, who supply most of the offal and refuse that attracts them. The *Gyps Bengalensis*, or Gidh, is the common one. When young its colour is a homogeneous brown, except the whitish neck; but as they become older, while the brown darkens, the back and rump turn to white, and it is apt to be mistaken for another species. *Gyps Indicus*, a large funereal-looking creature of different shades of brown and ashy and white, and the Scavenger Vulture, equally repulsive, of a dirty white and yellow, with black

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quills, also mix with the first in devouring their filthy food. The finest of all is the King Vulture, or *Otogyps calvus*, and to it the others at once give way when it comes to join in the feast. It soars to a great height, and even then the zone of white on its belly is conspicuous, and when it approaches nearer the body-plumage is seen to be of a glossy black, with some red about the head and neck. That these creatures detect their food by sight alone seems now to be fairly established, and, as one proof more, they have been seen, fifty of them together, perched on the rocks around a spot where a bullock was dying, drowsing away the time until life was extinct and the carcase ready for them. In contrast with these halalcore visitants of the hill are the nobler families of falcons, hawks, and eagles, searching at all times over the ground, and some of them nestling on the cliffs. The Shahin (*Falco peregrinator*) delights in such a country, and finds here a congenial home. The Bhyri (*Falco peregrinus*) is a cold weather visitant, and the Laggar appears at times, although it is said to prefer open and cultivated districts, rarely visiting the hills. The little Kestrel (*Tinnunculus Alaudarius*), so called from its hovering like a lark over its prey, is often seen hunting after lizards, cicadæ, &c., on which it chiefly feeds. The Shikra and several sparrow-hawks, that swoop suddenly on their quarry, instead of steadily pursuing it like the falcons, are common about the Ghauts, and the goshawk is said to be a rare visitor in the country

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around. Of eagles there is the Wokhab or tawny eagle, which has been seen feeding along with a number of carrion-crows on a heap of offal, and nothing could be more ludicrous than the obsequious and crouching manner of the latter, while the big bird was picking his bone unconcernedly in the midst of them. Other species, no doubt, pass over the hill, but the opportunities of seeing them closely are so rare that they cannot be named with certainty. The osprey hunts about the Panwell river, and the white-bellied sea-eagle (*Haliætus leucogaster*), a fine bird with pale blue-gray wings, variegated tail, and pure white breast, has been seen questing after crabs in the ravines. Only one of the Harriers, the *Circus Swainsonii*, has been recognised; its hues are pale and delicate in the male, and darker in the female; it may be approached by any one unarmed without driving it from its perch, but with gun in hand it rarely comes within reach. The Kites appear in their richest plumage in October, both the Chîl and Brahminy, but neither in great numbers. They are supposed to retire to the Deccan and to breed there during the rains, leaving Bombay and its neighbourhood to the undisturbed possession of the crows. At this season they return to their cold weather haunts, and every year have the fierce battle to fight with their noisy enemies before they are allowed to occupy them, that has been so graphically described by the old naturalist, Dr Buist, as to have become a standard

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story in the annals of Indian birds. In such close jungle Owls can hardly be seen, but several times the *Strix Javanica* has been disturbed in the early morning, and come distinctly into view. The unearthly cries of the *Syrnium indranee* have been already described in alluding to the superstitious fears that haunt the hill people, and no words can exaggerate the dismal horror of its hootings in the dead of night. Some of the tufted and horned species common on the Ghauts must be here also; they are yellow-eyed, and more or less diurnal in their habits, beautifully coloured, but subject to so much variation in their tints that the identification of species is extremely difficult. Several of them have been seen as pets among the soldiers at Poona and Khandalla.

Passing to the class of Insessores, which constitutes the main army of the local, and indeed of all ornithology from which water birds are excluded, the Fissirostral tribe, among which the Swallows and Martins hold a foremost place, claims first notice, and the Swifts, though differing in many points of structure, are usually associated with them. The common English swallow visits India plentifully in the cold weather, and Mr. Blyth, who has written so ably of the geographical distribution of birds, thinks that those seen here may probably have their breeding places in Central Asia. *Hirundo filifera*, so abundant about Poona, is not much seen here; the peculiarity most conspicuous in the male sex, the wire tail

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extending to five or six inches in length. The Mosque swallow frequents the cave-like hollows of the black rock, and the dusky Crag-martin flies about the points, often approaching so near that the white spots on the tail feathers can be clearly seen. The Swifts, those true denizens of the air, are constantly on the wing, but so few are the chances of handling them that the species have not been recognised. *Cypselus affinis*, so common throughout India, is said to be rare in these parts; some of the Alpine varieties will probably be among them, and a small one with tapering wings, no longer apparently than the fore-finger as it circles overhead, is supposed to be the Swiftlet that prepares with its own saliva the edible nest so much in favour with the Chinese, and that may act after the manner of pepsine in promoting Celestial digestion. The transition from the Swifts to the Goat-suckers is natural and easy, though they differ so much in plumage. One only of the *Caprimulgidæ* is common at Matheran; it is often seen squatting on the footpaths in the dusk, and taking short and silent flights ahead when approached. Shortly afterwards its peculiar call—tyook-teuk-teuk—breaks the deep stillness of the woods, and is continued with little intermission far into the night. This the *Caprimulgus Asiaticus* is the most widely spread of all the Indian Night-jars, and is either quite alone here, or accompanied but rarely by a frogmouth or Podargus, the peculiar melancholy wail

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of which has been repeatedly heard, though all efforts to get a sight of it have failed. Bee-eaters and Rollers are only rare visitants, but in the heat of the day they take their place with other birds on the telegraph wires, and hunt in their own peculiar fashion from it. Kingfishers, too, are in no great numbers, but the one resembling our European bird, and the pied variety that hovers and stoops like a hawk, may both be seen about the Bunds. Much more characteristic than these are a few of the family of Climbers, the Barbets and Cuckoos, whose noisy calls are heard at all times on the hill. Decaying trees, such as Woodpeckers haunt, being few in number in the upper forest, these, the more silent members of the same group, are rare; but the *Picus Mahrattensis*, the golden-backed Sultan woodpecker, and one or two others, are found in the valleys around. Of Barbets, on the other hand, the "Kootrook," or Common green one, is universal; it is hardly ever silent by day, and may even be heard by moonlight; it is usually seen alone, calling from the topmost branch of a lofty tree, but also in numbers together, and the noise they then make drowns all other sounds. Its ally the Coppersmith rarely comes on the summit, but its familiar call is not unknown. The "Coucal," again, or Crow-pheasant, with a deep sonorous voice, not unlike that of the Entellus monkey, is as widely spread as the "Kootrook," and though neither has any music in its call, they have both a fine woodland

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ring that suits well with the place. The true Cuckoos, although the Oombur would furnish them with abundance of food, are only in the valleys, and for some reason unknown, like many other birds, avoid the hill-top. The Paroqueets, for instance, although plentiful about the Mango Tope, never visit it; and the Magpie, which comes up to within a few hundred feet, is equally shy. Either of these would in a few minutes make the whole circuit of the hill, and yet their screams are never heard but when coming from below. Smaller birds also show the same prejudice, and at any time, looking from the cliffs about the Malet and Ponsonby springs, species may be seen perching on the trees that never, or only as stragglers, ascend higher.

From the Climbers to the Tenuirostres the step seems abrupt, as no two creatures could well present a stronger contrast than a Coucal and a Sunbird. The species of the latter are few, but there are plenty of them, and being familiar little creatures they are always in sight, flitting about from flower to flower, or hovering over them like bees. They feed both on the nectar and on the insects that are found in them, dipping their long curved bills deep into the corolla, and throwing themselves into the most graceful attitudes as they cling to the flower-stalk to pick out their food. Their colours are even more attractive than their forms, and they have sweet notes like those of a canary. The prevailing kinds are the

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same here as in the Deccan, the Purple Honeysucker and the Leptocoma of Ceylon being the most abundant. The rich plumage of the former is thought to be seasonal only, but the fine hues of the latter are constant. The males only are thus richly dressed, the garb of the females being in all cases plainer. When the breeding season is over, the purple bird (*Arachnechthra Asiatica*) is believed to cast off its rich livery, and to become of a dull olive-green above and yellow below, with a conspicuous violet central stripe, and spots of the same on the shoulders. Birds in the latter dress have been noticed to assume gradually the darker hues, though not to the full brilliancy of their final development, and it is remarkable that individuals of both descriptions may often be seen on the same passion-flower together for many months in succession, if not throughout the year. They appear thus at Poona in the rains, and the richly-plumaged one never fails during all the dry weather at Matheran. It may be that young birds undergo only partial changes, or old ones none at all; there is still mystery in the matter, and it would be satisfactory were the precise mode in which the rich dress is assumed more clearly explained. The Tiny Honeysucker is also on the hill, but being less familiar in its ways than the others keeps more to the jungle, and is seen rarely in gardens. Flowerpeckers have for the most part a northern home, and are represented here by the *Piprisoma agile*, a little

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creature of green and yellow hues, seen both singly and in flocks, the feeble voice in the latter case passing like a sudden breeze through the tops of the trees, as they travel from place to place. Creepers and other tribes of the thin-billed family are also mostly Himalayan, and the few that frequent the southern jungles have not been seen here. The Hoopoo, common on the hill as elsewhere, closes the list of the Tenuirostres. It is one of the most cosmopolitan of living creatures, changing its plumage but slightly in any part of the world, and the call which gives it its name is equally invariable.

An interesting group succeeds this, and is represented in many forms at Matheran. The Shrikes take the lead, and are distinguished by the plainness of their colours, their pugnacity, and their usual screaming note, though they can also make themselves amiable and whistle very sweetly. The *Lanius lahtora* or grey shrike is the common one, so named from its prevailing colour, which, however, is varied with black, yellowish, and white; the dark frontal streak of the family is conspicuous, and its call is harsh and grating. *Lanius Hardwickii* is also seen; and the common Wood Shrike, smaller than the others, ashy brown above and white below, with shades of red and gray on the belly, and dusky brown wings and tail, is almost as common as *lahtora;* it has none of the sulky look of the latter, there are frequently several of them together, and,

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although its note is also harsh, it oftener indulges in its mellow whistle. Much more numerous are the ever-present Drongos, and chief among them the King-Crow or "Kotwal." They are usually seen, especially at the breeding season, bullying one another or the crows and kites that come near them; but at other times they are less quarrelsome, though always lively and active; their note is loud and cheerful, and they have a sweet low chuckle, not unlike that of a swallow. *Dicrurus cærulescens*, the white-bellied Drongo, is much more rare; it is a smaller bird than the last, and, though coloured like it above, is known at once by the white belly and lower tail coverts; it has a pleasanter song, and more mellow temper also. *Dicrurus longicaudatus* has been seen; and *Pericrocotus brevirostris*, and perhaps *flammeus*, may be added to the Shrikes frequenting the hill at some seasons of the year, though not so constantly making it their home.

Of the Flycatchers there is one beautiful little creature that flits like a spirit about the woods, and is known as the *Tchitrea paradisi*, or long-tailed Bulbul. The crest, head, and neck of the full-grown male are of a glossy green-black, and the body-plumage white, the feathers of the wings being black, edged with white, on one or both webs. The white central tail feathers often attain a length of fifteen inches, and wave with wonderful grace as the bird flits silently, or with a feeble chirp, from tree to tree.

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It is most frequently seen alone, wandering restlessly from one branch to another, and quickly disappears when watched closely or followed. The best view of it is obtained as it bathes in the springs of a morning; it never alights on the rock or shingle, but dipping for a moment into the stream, flies on to a low branch, and quietly preens its feathers. The plumage of the very young of both sexes is chestnut, and the glossy green-black of the throat is replaced by an ashy hue, while the belly alone is white and the tail feathers of the male only, much elongated. These are also supposed to be the colours of the full-grown female, excepting that the throat is dark and glossy like that of the white bird, and the central tail feathers extend but a little way beyond the others. As the male grows older there is seen every possible variety in the mixture of the colours and in the length of the tail feathers, so that this pretty little flycatcher, by its many phases of plumage, is a puzzle to naturalists, and they cannot yet tell at what moults the changes take place, nor with any certainty which of them are sexual or merely seasonal.

Another small Flycatcher, hardly less attractive than the Paradise one, is the *Myiagra azurea*, and it is by no means rare. The head and neck are of a pale lazuline blue, with silky black spots upon them. These are wanting in the female, which is all over of a lighter hue, and white on the belly. Fantails are also common, *Leucocerca fuscoventris* being most

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abundant, but *albofrontata*, whose notes so nearly resemble the first bar of the negro melody, "Lucy Long," is met with too. Their coquettish ways, as they lower their wings and spread their fan-like tails when they drop from their short and fussy flights, are familiar to all, and their courage in attacking crows and other large birds must have often been remarked. *Eumyias melanops*, the verditer flycatcher, and *Cyornis rubeculoides*, the blue-throated redbreast, have both been found, and glimpses got of other birds of the same group, though too short and uncertain to name them. Dark blue and other shades of the same colour prevail in their plumage, variegated with brown, ashy red, and yellow. They are usually solitary and silent, but some sing sweetly, and in form and habits so much resemble our own Robin, that the homely name is almost as applicable to them as to the Thamnobia that usually bears it.

Including Bulbuls, Babblers, and other close allies, the family of Thrushes is the most numerous of all at Matheran, and one little spot in the Bund valley it was proposed to call "Pittawarra," The Abode of Thrushes, from the number of these birds frequenting it. The monsoon even does not drive them wholly from the hill, for they have been heard in the month of August, during a short blink of sunshine, singing as cheerily as they do in April. The scream of the *Myiophonus Horsfieldii* is heard in every thicket in the early days of October, while rain continues to

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fall. It is a dark-plumaged bird, glossed with blue, and having cobalt marks on the head and shoulders. The sharp note is uttered as it flies away when disturbed, but when at rest its song is the most comical attempt at whistling of any bird's in the jungle. In dry weather it is only seen near the springs, and constantly in their neighbourhood its unmusical notes, which it persists in repeating as if it had hopes of learning to sing some day, will amuse the listener. It would seem to be as stupid as its song indicates, for one of them, caught more than once in a deserted outhouse and allowed its liberty, though much alarmed, persisted in returning to eat its worm under shelter. Much smaller than the Myiophonus, and coloured somewhat like a mavis, is another thrush, the *Pellorneum ruficeps*. They are very numerous, and usually seen turning over the dead leaves in search of food, or creeping away into the jungle when closely approached; but morning and evening they perch on the trees, and can be seen readily. At such times they utter some mellow notes, such as are expected of a thrush, but more commonly, and especially when in small flocks, they have a noisy chatter; and the melancholy treble note like "baby-boy," so often heard in the woods, is that of the same bird. They are creatures of amazing courage, of which strong proof was once witnessed. Two males were found lying on a footpath, one dead, the other totally exhausted. When the latter recovered he was set

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free, and at once the melancholy call of the bird was heard near the spot where they were found, and kept up for a week afterwards at all hours of the day. It was supposed to be the female lamenting the loss of her mate; but from what has been learnt since, may have been the surviving male either grieving for the comrade he had killed, or rejoicing in his own sad way over his fallen rival. Equally abundant, though not so generally spread over the hill, is the small *Alcippe poiocephala*, of a dull ashy colour, with ruddy tints, and loose fluffy plumage. They move in flocks often, and utter hurried notes, resembling somewhat those of the chaffinch. Neither this nor the last show much dread of man. A Pellorneum may be shot, and its companions will look on curiously at what has happened; and on one occasion, when an unfledged Alcippe was taken up in the hand, not only the parents but the whole flock came chattering within a few feet, demanding as it were that the captive should be released. No less characteristic than these is the *Pomatorhinus Horsfieldii*, of a deep olive-brown colour, with a white streak over the eye, and a patch of the same of varying extent on the neck, breast, and fore part of the belly. The scimitar bill at once distinguishes it, and the fine woodland ring of its cuckoo-like call is constantly heard on all parts of the hill. They are nearly always in pairs, but on separate trees, and uttering their notes together, the female interpolating a gentle cuck-uk precisely at the same

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interval in the liquid gurgle of the male. They are shy in their habits as a rule, but the nest has been found within a few yards of a house, and made very rudely in a handful of straw thrown down accidentally by the roadside. It contained four dull white eggs, but from being so frequently disturbed the bird deserted them before they were hatched. Among the rarer thrushes may be named the *Petrocossyphus cyaneus*, or blue rock species, which is said to vary in colour, being more or less rufescent below; but as seen here occasionally on the higher plateaux, its hues are altogether dark. It is always alone, and in the cold weather only does it appear on the hill. Equally rare, too, is the *Turdulus Wardii*, or pied blackbird. Seen at rest it might be mistaken for the *Pycnonotus pygæus*, from its white-edged tail, but on closer acquaintance the same hue is seen to prevail much more extensively throughout its plumage than is the case with the black Bulbul of Bengal. The *Merula nigropileus* is also believed to be a rare visitor towards the end of the hot weather, both male and female of a bird answering the description of this species having been shot at the Bunds.

Among the ground-thrushes frequenting the woods are some of rich plumage and fine song. *Geocichla cyanotus* is common; it, and more rarely *G. citrina*, are frequently seen foraging for insects on dry ground carpeted with dead leaves. *Orocetes cinclorhynchus* is also among them, the young of which is so distinct

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from the old bird that it is difficult to believe they are of the same species. These ground-thrushes are usually silent, solitary creatures, coming seldom into view; but they change their habits with the approach of spring, and, instead of grovelling on the ground, will then ascend the taller trees, still rather shyly, not making themselves conspicuous, and sing very sweetly. One of them has notes almost as rich, varied, and sustained as those of our own song-thrush; they attain their full pitch about the middle of April, when the trees are bursting into leaf and flower, and as it pours out its fervid spirit in the quiet woods, awakens thoughts and memories that are seldom stirred by the song of birds in India.

The descent from these to the common Babblers of the hill is like passing from English to country music. These, the Malacocirci, are plain in plumage, grotesque in their habits, and have wheezy discordant notes, with no semblance of song in them. They are commonly known by the name of Satbhais, and there appear to be two species on the hill, *Malac. Malabaricus* and *Somervillei*, the latter having darker and closer plumage than its neighbour. They will mob any one approaching them at times, and pursue him with their harsh and creaking cries till he is well-nigh deafened, and this annoyance they often have recourse to when he is in anxious search after some interesting bird, that he would not give a feather of for a thousand of them.

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The Bulbuls again have pleasant notes, and in numbers prevail over every other kind of bird. *Otocompsa jocosa* is the common one; its cheerful liquid chirp is never hushed; it is the first to be heard at break of day, and does not cease till nightfall, especially in the neighbourhood of houses, where, picking up both fruit and insects from tree and bush, they love to congregate. Early in October the Madras Bulbul (*Pycnonotus hæmorhous*) is also seen, but it soon disappears, and its livelier ally has the hill to itself. The fearless confidence of most of the Bulbuls is very engaging. A pair of the Madras species built their nest on a bush bordering the verandah of a house at Poona, and the work was watched from the beginning. Both lent a willing bill to it, and it was completed within ten days. In the course of another week four spotted eggs were found in it, and in ten days more the young were hatched. All was over in a month, and most assiduous the birds were in their doings, the male encouraging his mate by creeping about the neighbouring branches with wings spread and feathers ruffled, uttering at the same time a low pleased chuckle to her as she sat upon the nest, much after the fashion of some ayahs, who crack the joints of their fingers over their heads, and with other antics express their delight, as they lean fondly over the child they are nursing. The beautiful *Iora Zeylonica*, of brilliant black, yellow, and white, when in full plumage, is often heard uttering its shrill and pro-

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longed note. When not in seasonal dress, there is much green mixed with or replacing the black, and this is the prevailing hue of the upper plumage of the female at all times. It has very much the habits of a Titmouse, and in the hot weather comes often in pairs close to the houses along with the Bulbuls, of which it is a near ally. The larger and less brightly coloured *Iora tiphia* appears also to be here, and but for the doubt expressed by Jerdon, would have been confidently named among the birds of the hill.

Akin also to the Thrushes are the still more gorgeously-coloured Orioles, and their representative here is the famous Mango-bird, *Oriolus kundoo.* The bright yellow and black of its plumage contrast most beautifully; it has deep blood-red eyes, and the bill is of a lake colour. It has the loud mellow whistle of the family, a double note, which it utters as it flies from tree to tree, never alighting on the ground. It comes only in the hot weather to the summit of the hill, but even then is more common in the lower valleys. Among Warblers are the Dayal or magpie-robin of the plains, but only as a rare visitor. The little dusky Thamnobia, so like the redbreast in its ways, and the bush-robin (*Pratincola caprata*), with much white in its plumage, are more about the borders of the hill, though the former pretty often, and the latter now and then, may be seen in its central parts also. The same remark is applicable to the Tailor-bird, which finds itself, like the others, more at home

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in well-populated districts than in places overrun with jungle. The more adventurous wagtails again are abundant, the grey-and-yellow species being the most numerous, but the ordinary pied one is often about the Bunds, and the fine large *Motacilla Madraspatana* has been seen in the same neighbourhood. A species of Pipastes or tree pipit, of a brown hue on the back, and spotted on the dull white breast, is not uncommon, but it is extremely shy, and has never been closely examined. *Parui cinereus*, the Indian grey tit, is found about the hill, but neither the members of this diminutive family, nor their allies the tit-larks, take any distinctive place among the birds that frequent the summit.

The Conirostres are represented by the common Crows, *Corvus culminatus* and *splendens*, there being a few of them only when the season opens, but they come in numbers when the station is full. *Dendrocitta rufa*, the tree-magpie, as already noticed, comes very near, though seldom upon the summit ; but Mynas are plentiful, both the common Indian one and the more local *Acridotheris Mahrattensis*. Of the Fringillidæ, the small *Fringilla rhodochroa* is, perhaps, the most numerous of any ; the male has a fine crimson head and neck, the rest of the plumage being plain, and the female is dull-coloured throughout. A dozen at a time may be seen bathing in the streamlet that feeds the reservoirs in the early morning, along with flycatchers, wagtails, and some of their own group

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that have yet to be identified. In the long grass on the crest of the hill the black-headed Munia is seen, and the Indian sparrow comes about the houses, though in no great numbers. No colony of Weaver-birds has been noticed; but they may come up singly as their homes are not far off; and the Larks have but one common representative, the *Spizalauda deva*, or small-crested species.

Of the Gemitores or Pigeon tribe, *Crocopus chlorigaster* is believed to be the ordinary green one; it is much varied with tints of yellow and ashy; but green is its prevailing hue. Its habits are best watched by sitting near a spring, in some retired part of the hill, not accessible to the water-carriers. There is one about midway between Echo and Louisa Points, overshadowed by a large tree that is much frequented by them; but glimpses of them may also be got in any open jungle. There are seldom more than two or three together, even at the springs, which they visit at a regular hour in the morning to drink, as is the habit of pigeons. Their flight is extremely rapid; and, while their colour disguises them in the trees, they dash with such force into the woods, when disturbed, that a satisfactory inspection of them is hard to obtain. Some appear to have more brilliant colours than the Crocopus, and belong probably to the genus Osmotreron. The common *Columba intermedia* is everywhere about the cliffs; and several times a large imperial pigeon, that may be the *Carpophaga insignis*, has

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been seen about the springs. Doves are not in great numbers, but the spotted one, or *Turtur suratensis*, is that most frequently noticed ; the Cambay one comes little to the summit, and the ringdove also prefers lower ground. A nest of the last, found in a Cactus bush, was made of small sticks laid crosswise, having no hollow, and two white eggs lay on its level surface. The Rasores or game-birds are fast disappearing, and their pleasant calls are much missed. At one time the handsome *Gallus Sonneratii* was very plentiful, and early residents record that it issued from the jungle daily, to share their food with the household poultry. It is now only seen at rare intervals, though its call may still be heard in the more richly wooded valleys, along with that of the Peafowl, which also is leaving the hill. The fine plumage of the Jungle-cock is well known, and in England its hackles, along with certain feathers of the large Woodpeckers and the Bustard, are much sought after by anglers, for whose purposes the peculiarity of having contrasting colours on their two surfaces gives them their value. This Jungle-fowl is only met with in Southern India, that of Ceylon being a different species, though somewhat like it ; while the bird called by the same name from the north-west, and the Terai, is a compact bantam-like creature, quite distinct from this both in shape and plumage. The Spur-fowl (*Galloperdix spadiceus*), is by no means so shy ; it continues to hold its own against much persecution, and its call, which has

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suggested its Mahratta name "Kokátrì," is still heard all over the hill. It has become wary, however, and is seldom flushed, but runs off into the jungle when caught feeding on the footpath. Like most game-birds, it is a careless nestler, and its dull white eggs, somewhat larger than a pigeon's, have been found on the bare ground. There are no Partridges to be seen, unless we include among them the little Bush-quails, which are really partridges in miniature. There are two species of the Perdicular, the rock and jungle kinds; but the painted one found not far off at Karlì, a valley, by the way, noted for the many kinds of quail that frequent it, has not been seen. There is little ground suitable for the common Grey and Rain-quails, but the small fluffy Button one, either the Dùpkì, or its near ally, which is a shade larger, conceals itself among the grass, and is flushed with difficulty. With this, the very tiniest of game, may be closed the list of the Matheran birds. It would be a work of years to make it complete; and daily, while opportunity lasted, additions were being made to it; but from the inaccessible haunts of some of them, the swift flight of others, and the aversion to kill many within reach, there are blanks enough in it that have yet to be filled up. Imperfect as it is, however, were all those named to be recognised from the few words said of them, the pleasant hours spent in watching them will be doubly rewarded. Among them is nearly every one whose call or song gives life to the woods, and many who

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hear them gladly will be yet further gratified to learn their names, and become familiar with their history.

REPTILES.

Few people go in search of these repulsive creatures, or take an interest in their cold-blooded nature; but, while roaming through the woods intent on other pursuits, they will often force themselves into notice, and afford opportunities for watching their habits in their native haunts that are well worthy of record. Such chances offer constantly at Matheran, and it is from experiences gained by never losing one of them, far more than from minute examination of their scientific distinctions, that the notes we have collected are likely to be valued. Aided and informed in these higher matters by the interesting work of Dr. Günther, and by his report on the valuable Collection of Reptiles presented to the British Museum by Dr. Leith, a goodly number of species have been identified, and some approach made to a fair representation of those that are most prevalent on the hill. There is no species known to be peculiar to it, but, like other animals, they have a varied geographical range throughout the country, which in many instances has been defined with a precision that is most remarkable.

No Tortoises ascend to the summit of the hill, nor any large Lizard, unless it be occasionally the *Varanus dracœna*, which inhabits the Nullahs around. It attains a length of four feet; and, although in no way a

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dangerous creature, has a formidable look. It enters houses at times, and an instance is known of its having concealed itself behind a bath-tub, giving no sign of its presence till all egress was cut off, but then creating such an alarm that, but for the possible results of real terror, would have been utterly ludicrous. They show great tenacity of life, as was noticed on the same occasion; for the poor creature, after it was apparently beaten to death, and drying up in the sun, managed to crawl into its hole a few hours afterwards. The smaller lizards belong to the families of Skinks, Agames, and Geckos. The first are to be seen in every verandah, hiding under the matting, or rustling among the dry grass and dead leaves by the road-sides; the Agames basking in the sun on the trunks of trees and on bare rocks, while the Geckos remain mostly under cover. The common skink is the *Euprepes rufescens;* it has a shining, scaly, flattened back, with two dull-white streaks along the sides, and the belly of a clearer white throughout. It grows to a foot or more in length, and is timid in the extreme, showing no inclination to be familiar. About the same size, but differently coloured, and very rare, is the *Eumeces punctatus*, or dotted skink; it is streaked and spotted all over with brown and white, and the ground colour is a dark grey; it is very active, running rapidly up trees, and hiding about the higher branches; it will turn round in a threatening attitude when pursued, but more, perhaps, in fear than in anger

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Eumeces Hardwickii is much smaller, of a brownish colour, with series of black dots and yellowish white bands more symmetrically arranged, and altogether white below. This, and the diminutive *Chiamela lineata* found by Dr. Leith, have also to be numbered with the Scincidæ. The last must be rare indeed, when Günther says of it, that "it is not known in what part of the East Indies it is found."

The measured notes of the Geckos, six or eight in succession, are usually heard at dusk and in the early morning, not often repeated, as with short quick steps they run about the walls in search of insects. There are several kinds, of which *Hemidactylus maculatus* is the common small one, with tubercules all over the body, and arranged in verticils on the tail. *Hemid. Sykesii* attains to a much larger size, and is rarely seen, aiming at the larger moths, but warily keeping close to the ceiling, and retreating rapidly when alarmed. *Gymnodactylus deccanensis*, again, conceals itself under stones; it is a curious little creature of a reddish-olive colour, streaked on the neck, body, and limbs transversely, and very squat like the rest of them in its figure. There are two Agames of the genus Calotes—the large light-green Versicolor with the seasonal reddening of the throat that gives it its name, and, on trees, *Calotes rouxii*, blackish, and with brick-red or copper-coloured blotches in the breeding season. The more richly coloured Lizards of this or allied genera do not appear to frequent the

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summit of the hill. There is a very small one, however, not identified, that is prettily marked with triangular black spots along the back, the base towards the spine, and diminishing in size as they approach the tail. The Chameleon has not been found, but seems to be familiar to the hill people, and, from the known distribution of this anomalous creature, they have probably seen it. Much more doubtful is a winged lizard, or Draco, that they speak of. No such animal has yet been found further north than Canara; but, as some plants take a long leap from the south to the summit of Matheran, appearing nowhere in the interval, it would be very interesting to find out that there are animals scattered in the same eccentric fashion.

After the Lizards the Snakes naturally follow; but, as the interest of the Reptile class culminates in them, such information as has been gathered about the Frogs and their like will be given first. The largest of them, *Rana tigrina*, or Bull-frog, is seen only in the small pools fed by the springs as they issue from the rock, a peculiarity in the nature of its dwelling said to be common to it all over the world. A pair of them were for a long time to be seen in such a spot below the road that skirts the Maldoongar Ridge. They were of great size, measuring over a foot in length when the limbs were extended. They have large and prominent eyes, tongue broad and fixed in front, and teeth on the roof of the mouth, while the

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toes are webbed to the tips in front, and behind nearly free. Another frog not so large, much darker in its hues, having a white streak along the back and pure white belly, is more rarely seen. It answers the description of *Rana hexydactyla*, but dashes into the water with such a spring when disturbed as never to have given a chance of close inspection. The common species, *Rana gracilis*, so constantly seen hanging helplessly in the water, but wide awake all the while and ready to skip off at a moment's notice, is of a light colour, with numerous spots and bars of a darker hue. It is small compared to the last, but in such numbers that in the croaking season their accumulated voices, by the Bunds especially, fill the whole valley with their uproar. *Bufo melanostictus* is the ordinary Toad; and there are several Tree-frogs of the genera Hylorana and Polypedatis, slender and active creatures, that take long leaps when they are touched. Their ground colour is pale, with darker but still dull streaks on the body and legs, and they all have the disks on the feet that enable them to cling to the smoothest surface. *Hylorana malabarica* and *Polypedatis maculatus* are common; and the small kind, often seen perched on the edge of a basin or tumbler, is either an Ixalus full grown, or the young of the latter species. These small ones are very silent, and the whole sub-class, it would seem, have the vocal sacs rudimentary, and a feeble croak. There is no place for the tailed Batrachians on the

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hill, nor are any of the worm-like Cæcilia found, that were at one time classed with the Snakes, but are now regarded as nearer allies of the Frogs and Newts.

Returning to the Snakes, into which the limbless Saurians, as remarked by Günther, pass so naturally, forms are first met with, hardly distinguishable from the latter in appearance, but separated from them by the ophidian structure of the jaws. This peculiarity consists chiefly in the extreme mobility of the bones of the head, which are freely separable in every direction, and in the presence of a long tympanic bone from which the mandibles, joined at the symphysis merely by ligaments, are suspended. The teeth are usually numerous, very sharp-pointed, and inclining backwards. They afford a ready means of distinguishing innocuous from venomous serpents, for if, on opening the mouth and running the edge of a penknife along the upper jaw, two complete rows of teeth are seen, one on the palate, the other on the maxillary bone, assurance may then be given that there is no poison-fang. The hind teeth of the non-venomous are sometimes enlarged and even grooved to strengthen them; and in many those in front, both of the upper jaw and palate, are elongated, but the latter are neither grooved nor perforated. In poisonous snakes, on the other hand, the penknife comes in contact with perhaps one or two ordinary teeth on the back part of the maxilla, and passing forwards it raises the long canaliculated fangs which convey the poison into

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the wound they make. The structure of the fang varies; it may be fixed to a maxillary bone nearly as long and as immoveable as that of the harmless snakes; it is then more or less erect, shorter than in its full development, and the channel is generally visible as an external groove. Such is its form in the Cobra, Bungarus, &c., while in the true Vipers, as the Daboia and Echis, the maxillary bone is very short and mobile, and carries no other tooth, but the long poison-fang which is then quite closed and without visible channel. It is laid backwards when at rest, and is raised with a tremulous motion when the animal is excited and preparing to strike. Some rudimentary fangs, not yet ossified, lie behind the poison-tooth in the folds of the gum; and, by a process not yet very clearly described, replace the other when lost, or shed naturally. The poison-gland, corresponding to the parotid of mammals, lies above the angle of the mouth, involuted in a sheath to which the muscles pressing it are attached, and a winding duct conveys the secretion to the fang. This fluid, clear and viscid, varies in quantity with the size of the snake, from a few drops in a small Echis, to half a teaspoonful in a full-grown Cobra or Daboia. It is said to aid the process of digestion like the ordinary saliva of other species. The latter even was long thought to be deleterious, but the number of the "Suspecta," as snakes without distinct fangs were wont to be called, appears to be steadily diminishing

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and their saliva will probably be found no more hurtful than the reputed poison secreted by the Toad, or their bite worse than that of an Iguana.

Dr Günther asserts that all snakes drink much, and that their digestion is rapid; but however soon they may die if deprived of water, it cannot be a daily necessity to some of the slow-moving species that are often seen a long way from it, and experience at Matheran and elsewhere rather favours the belief that the process of digestion is usually long in being completed. On one occasion a large Cobra was shot, and its stomach found distended with the eggs of a guinea-fowl, whose nest it had robbed. Several of the eggs were quite whole, and one had the shell so little affected by the gastric juice, that it was thought worth while to remove it, and give it in charge to a brooding hen along with her own. In due time the chick appeared, and, under the name of "Jonah," took its place among the rest of the brood. Snakes' eggs are seldom seen, being hid away usually in holes in the ground. They are self-developed, with the exception of the Boa's, whose incubation in confinement has been minutely described. Some families are ovo-viviparous, while the young of the vipers and water-snakes are born alive and active. The proportion of venomous species found on the hill is very considerable, perhaps one in three or four of all that are killed. They belong to the genera Bungarus, Trimeresurus, and Naga of the Colubrine class, and to

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Daboia and Echis of the vipers. Accidents are yet wonderfully rare, only one fatal case of snake-bite having been reported for some years past. This immunity is remarkable, for in other parts of the country, where nearly the same snakes prevail, the mortality from their bite is very serious, amounting in single collectorates, as in Sind and some parts of the Madras Presidency, to one, or even two hundred annually. The fierce little "Kuppur," from fifteen to twenty inches in length—and those approaching the latter dimensions quite exceptional, while the thickness is more variable with age—is the most fatal in Sind. Its powers are not appreciated in this country, or it would not have been said that no snake under eighteen or twenty inches in length has been known to kill a man; nor is it true with regard to the "Kuppur," what Sir J. Tennant remarks of the snakes of Ceylon, that their victims are mostly women and children. The sufferers in Sind are for the most part men in the prime of life, and, as reported by Dr. Imlach, they succumb to the poison almost as readily as women, while, in a very large proportion, it is the "Kuppur" that kills them.

This and the Naga or Cobra, in all their varieties, bear the worst characters of the whole family, partly owing to their numbers, and partly to their ferocity at particular seasons. Imlach states, but not very clearly as an eye-witness, that although the Cobra exceeds the "Kuppur" so much in size, it succumbs to

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the bite of the smaller snake, and dies from it in half an hour. This must be doubted since the more recent experiments of Dr. Fayrer, which go to prove that the venomous serpents cannot inflict a fatal bite on one another. The "Daboia" employed by him is more sluggish and less aggressive than the "Kuppur," but it inflicts the most deadly wound of all on man, and from its great size and the quantity of poison it injects, is more likely to prove fatal to the Cobra than its diminutive ally.

The link between the Saurians and the Snakes is formed by the Blindworms, and we have numbers of these on the hill after the rains. At that season they are frequently seen on the roads, and at other times while digging the foundation of houses, or otherwise breaking up the ground. Three species have been identified, the largest and most varied in colour being the *Onychocephalus acutus*, which attains to a length of sixteen inches, but is usually within a foot. Its hues are bronze and yellow, the latter in bands and spots, that become larger towards the tail, which, as in others of the family, has the appearance of having been cut off obliquely, and terminates in a spine. Much smaller is the uniform brown *Typhlops braminus*, and the still more diminutive and slender *exiguus*, shiny and bluish in its hue, has been picked up also.

Among the innocuous serpents the most abundant of all is the *Passerita Mycterizans* or "Nannettì" of the natives. It is usually seen crossing the road with a

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sailing motion, the head erect, and turning gracefully from side to side. It might be admired but for the hard stare of the lidless eyes, a peculiarity it shares with all Snakes, and that, unbroken by wink or eyelash, gives them the cold merciless look, that fascinates and paralyses their victims. The Passerita is known at once by its long snout, which has a flexible appendage formed by the folding of the rostral shield, The head is distinct from the neck; on the latter are some black and white markings, which become more visible when this part is expanded, and the colour of the whole trunk and tail above is a bright grass-green. The scales on the back are elongated and larger than the others, having somewhat of a bronze tinge, and a yellow stripe runs along each side of the belly. It attains to quite four feet in length, the gradually tapering tail being about one-third of the whole. It is said to be vicious and to bite readily, and wounded ones have been observed to lay hold of a stick or gun with their long sharp teeth. These must pierce to some depth, but as there is no poison-fang among them cannot wound dangerously. Another Tree-snake, *Dipsas trigonata*, is nearly as common. It is of a duller hue throughout, and more varied than the last; brownish-olive is the prevailing colour, with a light streak along the back, and bands of brown on the head and face, the sides spotted brown and the belly white. The head is broad and depressed, with a rounded snout, and distinct from the

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neck; the eye is large, and the pupil vertical, indicative of its nocturnal habits; it has large teeth in front, and the posterior one of the maxillary is grooved. *Dipsas forsteni* is the species in Dr. Leith's list marked as having been found at Matheran, and *Ceylonensis*, he says, extends also into the Bombay Presidency; but the light streak along the back seems to mark *trigonata* as the common one here. They often enter houses in their nightly wanderings, and one evening some alarm was felt, on seeing the long whip-like body of one of them twining round the barrels of a loaded gun, that stood in a corner of the room. It was quickly but cautiously pinned to the wall with a stick, and its mate, as not unfrequently happens, was killed a few feet from the verandah on the following morning. *Dendrophis picta* is also met with, and is a much more beautiful snake than would be supposed from any description of a preserved specimen, as the fine pale blue between its loose bronze-coloured scales only shows when the creature is alive and in motion. Of far more formidable look, but still fangless, is the large "Damun" or *Ptyas mucosa*. It has been seen eight feet long, and somewhat thicker than a man's wrist. The creature had entered a bath-room in pursuit of a rat, and was making its way into the adjoining bedroom when first noticed. It stopped in the door-way, raising its head about a foot from the floor, and, flickering its forked tongue, stared fixedly at the inmates, one of whom was sick

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in bed, and the other sitting beside him. Both sprang up, and the snake in equal alarm returned the way it came, and escaped unharmed. It was repeatedly seen afterwards, always about mid-day, and at last was caught napping, stretched out its whole length on the branch of an Oombur tree. A shot at once brought it to the ground, and the writhings of its long powerful body before it died were horrible to witness. When quiet enough to be approached and examined, it was found to be a fine specimen of the "Damun," the colour brownish-olive, the hind part of the body and the tail being reticulated with black, and all the scales edged with the same. The large shields of the head and the double rows of teeth show satisfactorily that it is not poisonous, but it is said to be very irritable and to bite severely. The curious whine, like the sound of a tuning-fork, it gives out when enraged, has not been observed; but that it does so cry, Cantor's testimony seems to satisfy naturalists. The Rock Snake of the hill is the *Python molurus*. The Tullatí or surveyor of the station, when occupied with his work on Chauk Point, returned on one occasion with an alarming report of a monster serpent, which is supposed to have been a Python; but it was never seen again, and the only signs of their presence are occasional marks on the dusty roads of such enormous width, that they could scarcely be the tracks of a Damun, or of any other snake, but one of those monsters, which often exceed twenty feet

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in length, and are of proportionate thickness. On the authority of Sir Mark Cubbon, who gloried in dreadful tales of them, and whose vivid account of the death of one over thirty feet long no one can forget who ever heard "the old man eloquent" relate it, they may even attain to a length of forty feet; but of this the evidence was only satisfying to Sir Mark himself, and his guests looked incredulous as he pressed it upon them. Of the smaller non-venomous ground-snakes, there are several kinds, the *Tropidonotus plumbicolor* being among the most frequent. It appears to be this, or one of the same genus, that is often seen treating itself to a bath in the Reservoirs, the head close to the surface, and rippling it slightly as it swims about. It dives at once when approached, and does not show itself again for some time afterwards. The prettily coloured *Oligodon fasciatus*, much banded and spotted with brown and yellow; *Ablabes humberti*, reddish olive, with punctuated line along the sides, and black dots edged with yellow over the spine, also distinguished by a collar and dots on the belly, as well as *Cyclophis nasalis*, greyish-olive on the back, which is variously streaked and spotted, and with a white belly; and *Cynophis malabaricus*, the most richly variegated of all, have likewise been found at Matheran; and to these Dr. Leith adds the curious stump-tailed *Silybura macrolepis*, one of the Uropeltidæ. The family of the Lycodons, from their dentition, were long ranked among the "Suspecta;" both the maxil-

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lary bones and the mandible being furnished with long fang-like teeth, far the better laying hold of the slippery skinks, on which they chiefly feed. The *Lycodon aulicus* is the species found here, a very widely distributed Snake, with varied markings and coloration, but usually brown, with bars and reticulations of white. It is about two feet long, very fierce like the rest of the family, and bites severely, though not dangerously.

Passing to the Elapidæ, we have at the head of them the Cobra (*Naja tripudians*), of which so much has been written that little need be said of it here, further than that all good accounts of it have a fascination of horror in them that never flags. They are not so numerous as in the plains, and seem to bear a much smaller proportion than usual to the other venomous snakes on the summit of the hill. *Bungarus cæruleus*, the "Munnìr," is more frequently seen, and is much dreaded. It is described as varying in colour, being either uniform brownish black, or with very narrow white streaks, radiating generally from a white vertebral spot, and a white belly; the length about four and a half feet. One specimen had broad black and yellowish rings alternately on the body, the edges being very irregular, and belly of a yellowish hue; its head was completely destroyed, but the markings seemed more to correspond with those of *Bungarus fusciatus*. The dentition of the genus is the same as that of the Cobra. The most abundant

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of all the venomous snakes is a Pit-Viper, the *Trimeresurus gramineus*, of a green colour, with a reddish hue on the tail and streaks of red on the sides; the head has scales, not shields, on the crown; it is a foot and a half or more in length, rather sluggish in its motions, and dangerous from its lurking in trees, or among the grass by the road sides. The effects of its bite are said to resemble those of the Kuppur or Phoorsa, but not so severe. Like the other Trimeresuri it has a long perforated erectile fang on each maxillary, and no other teeth on that bone.

The true or typical Vipers, of which there are but two genera in India, have also the peculiarity of the Crotalidæ, that the head, instead of being covered with the normal shields of other snakes, have scales mostly in their stead. They are thoroughly terrestrial in their habits, having a robust body and short tail. They are nocturnal also in their ways, as is shown by the vertical pupil, and on this account all the more dangerous. The *Daboia Russellii*, "Gunnus," or Cobra Monil, has the greatest repute for its venom. It appears to range over a large extent of country, and one specimen only, for it is nowhere numerous, has been seen at Matheran. The nomenclature of snakes among the natives being uncertain, there was some dispute about its name among the people gathered round it. The Mahrattas called it "Gunnus," but a Thákur pronounced it to be their "Zihrì Mùndel." It was of a greyish-brown above and dull

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yellowish below, with ovate and circular markings on the body. The head and face were varied with the same hues, but subdued perhaps from age, for the young are said to be remarkable for the beauty of their markings. The length was about four feet, the body very thick, and the tail abrupt. The large nostril and wide upper jaw, from which were taken two fangs, complete tubes, nearly half an inch long, and with the usual curve, gave it a most repulsive look, and impressed one with the terrible fatality of its bite. The part bitten mortifies rapidly, assuming the colour of the snake when it is old, and this is not inaptly described as that of gangrene. The victim rarely survives long enough for these appearances to be developed, the virulent poison acting directly on the nervous system, and causing speedy death; but if the quantity injected is small, and time is allowed for the disorganisation of the blood, the native description will probably come very near the truth. The only other true Viper is the small *Echis carinata*. The fatality of its bite, especially in Sind, has been already noticed, and from the number of deaths occurring annually, that were attributed to snake-bite in some Collectorates of that province a good many years ago, suspicion arose that the alleged cause was a mere blind to disguise the systematic practice of poisoning. Careful investigation, however, revealed the truth, and it was found that the small Echis was pre-eminent among the whole family of Snakes in inflicting this

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terrible scourge on the population. On account of its small size, and the comparatively minute quantity of venom injected, the symptoms caused by its bite are more slowly developed than with the large Daboia, and death appears to be hastened towards the end by the exuding of dark corrupted blood from every part of the body. All the secretions are coloured with it, and the membranes of the eyes, nose, and lips, so stained that the sufferer looks as if in the last stage of the worst forms of fever. Recovery was once witnessed from this hopeless condition, by the use of large quantities of Tannin along with the usual stimulants. It was above all things needful to stop the profuse hæmorrhage, and the friend who suggested it, should this meet his eye, will remember how well the remedy succeeded in checking it. The natives have many plants in which they put their trust for the cure of snake-bite, but they are doubtless for the most part inert, and have all failed on a fair trial. The well-injected poison of a Daboia or a Cobra, it is to be feared, hardly admits of cure; of it, as of severe cholera, the saying holds true, that in its effects on the system "it begins with death"; and the great mortality caused by it in India, however skilful treatment may tell when that can be applied, will always continue at a high rate while these and other deadly Snakes abound.

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ANNELIDS, CRABS, AND SPIDERS.

Awaiting and inviting further study are a few animals belonging to the Orders that follow the Reptiles, and seen in such numbers at certain seasons that they demand here a passing notice. Conspicuous among them are the Leeches, those active and vicious little enemies, so familiar before and after the monsoon. There may be different species, but *Hirudo zeylanica* is supposed to be the common one. It attacks both man and beast, draws blood freely when it lays hold, and bunches of them are constantly seen on a pony's fetlocks, and sometimes in his nostrils. While searching after flowers and ferns, the legs and ankles get covered with them, so that long boots are essential for traversing the grass, and a horse may be protected by smearing his legs with tar or tobacco juice. Gecarcinæ or Land Crabs also abound. They clamber over the wet rocks while the springs continue to flow, and afterwards bury themselves in the ground so long as it retains any moisture. They are a favourite prey of some of the larger birds, and are eagerly sought after by the Hill people, who dig them out of the damp nullahs, and carry them home to give a relish to their rice. Millipedes of the genus *Iulus* are often seen moving along with an undulating motion, or coiled up in repose, with their numerous legs contracted and hidden. There are flattened

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species, also, of the genus, *Polydesmus*, and the curious Cermatia, much like a bottle-brush, comes frequently within doors. Centipedes are not uncommon; they may be seen six or eight inches long and about half an inch broad. The smaller ones are black or brown, and the larger partly of these hues, but variegated with broad stripes of orange and yellow. Scorpions, again, are under every large stone, the great *Scorpio afer* especially, and when the first heavy rains fall they become dangerous from the numbers of them that infest the houses. They attain to a length of ten or eleven inches in rare cases, and in such monsters the nippers are like those of a crab, and the stiff bristly hairs that cover them all over add much to their ugliness. The colour of this species is almost wholly black, with dull yellow bands on the legs and brown ones on the tail. There is a small one also of much lighter hues, nippers, legs, and tail being cinnamon-coloured and flushed with red, while the body is dark brown. Its sting, for its size, is reputed to be more painful than that of the black one; but serious results rarely follow either, and the severe pain is allayed by the use of chloroform or ipecacuanha.

The Spider family have not had their species identified with precision, although this may now be done, perhaps, with the help of an interesting memoir on the subject, published lately in the Proceedings of the Bengal branch of the Asiatic Society. Among those that have been observed are a large hairy Mygale

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that lodges in the crevices of the mud walls, and two or three of the Epeiræ that construct their powerful webs alongside or across the footpaths. The Phrynnus, with antennæ four or five inches long, armed forelegs and a brown body streaked with yellow, is among them. A small Salticus springs about the floor, and the Galeodes, a widely-distributed genus, covers the ground with its tunnelled webs in every direction. A Water Spider, with elongated body and straight antennæ, has been noticed at the Bunds, and the long-legged Phalangium (?), that congregates in corners of rooms and on mosquito curtains, is often seen. The clusters they form here are considerable? but in Canara Mr. Dalzell reports having seen the same spider in such masses that he could only compare them to a bear-skin, the bodies being felted together, as it were, and the long legs hanging down like hair that had been carefully combed.

A few Land-Shells have been picked up. There are two species of Helix, which occur in heaps, as on a sea-beach, under the ledges of the laterite rocks. A Cyclostoma, of handsome form, and with the trumpet-shaped mouth, is common; while the spiral Achatina is confined to a few places. They are usually much broken, being pierced by the bills of thrushes and other carnivorous birds, for which, along with innumerable Earthworms, they furnish abundant food towards the close of the monsoon. They rank low in the scale of being; but for them, the small Fish, Nudi-

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branchiæ, and other creatures that swim in the waters of the reservoirs, whether visible to the naked eye or revealed by the microscope, no fitting place can be found; and this slight allusion is made to them merely to suggest how varied are the forms of life that inhabit the hill; and to hint to any naturalist visiting it, that his holiday will be well spent in extending our knowledge of them.

INSECTS.

Were it not for the host of enemies they have to contend with from without, and the intestine war that goes on among themselves, the swarms of this class of animals at Matheran would altogether overrun and occupy the hill. Nearly all Orders are well represented; and once more, what has been remarked of the plants and higher animals may be held as true of them also; that, with no forms peculiar to the locality, the mode of their grouping has a character of its own, many of those most plentiful here being rare in the surrounding country, and a few found that do not appear in Collections either from the Deccan or the Sea-coast. The fine enthusiasm that pervades the old records of the Insect World clings to them still, as the wonders revealed by Reaumur and Huber find interesting parallels in the most recent discoveries of modern times. The habits and instincts of many groups can never again be more lovingly noted; but as new species accumulate from distant countries,

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their distribution over the earth's surface, their curious relations to the changes that are taking place on it, their mimicry of one another, and the protective resemblances they assume, are strange phases of their life-history that have been observed only of late years. They have shown, too, a suppleness of accommodation in these respects greater than any other class of animals, so that the facts supplied, and the deductions suggested by them, are of a kind not yielding in interest to anything that has been written of them before. The law that regulates these seeming freaks of nature may be obscure, but doubtless there is one reigning supreme; and whether that of natural selection, now on trial, and in favour with many entomologists, prove true or false eventually, it must at least be regarded as a very noble intellectual effort at generalisation, in relation to a subject that is wrapt in mystery.

In the endeavour to give an outline of the Insects of Matheran, we miss much such guidance as we have had for the Botany and the higher Animals of the hill; for though diligent search has been made in the works of Horsfield and Moore, Drury, Westwood, and many more, so as to identify species, all would have failed had not Dr. Leith come to the rescue. To the helpful hand of this accomplished Collector, who has given the names of nearly all the species sent to him for identification in drawings and photographs; and to Mr. Forsyth Hunter, by whom the drawings were made, is owing all that is definite or correct in arrange-

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ment, and much that is of interest in the life-history of the Insects here presented ; it is little more than a catalogue, but may serve a useful purpose by giving an intelligent direction to their further study.

FIRST ORDER.—*Lepidoptera.*—Butterflies are not early risers, few of them taking flight until the sun is well up. An occasional Eusemia may be seen fluttering about at daybreak, but hardly before eight or nine o'clock do the Papilios, Pierides, and other families emerge from their resting places. About that hour throughout the month of October, and still more in November, the flowering trees and shrubs are covered with them. They are most abundant near water, and nowhere in such numbers as in the broad water-course on the western flank of the Panorama ridge, where most varieties may be seen, not only flitting about the bushes that clothe its banks, but resting on the stones, and even the gaudiest among them settling on the mud beside the stream. The Atalantia and Sapota trees are special favourites of the Papilios. They are also in numbers, but mingled with Pieris, Danais, and others on the rich yellow flowers of the Crotolaria ; while the Dalbergia, then also in flower, attracts not only the latter, but still more the smaller Families of the *Lycænidæ*, *Hesperidæ*, and the like. On these, and on many plants besides, all kinds spend their mornings. About noon they retire into the shade, an occasional one only appearing in the open glades at

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mid-day. There are a few that appear rather to court the sun's rays even at their hottest, and as evening approaches the more conspicuous ones again appear in numbers for an hour or two before retiring to their resting places in the jungle for the night. Thus happily are their short lives spent, until the female lays its eggs, and they die off for the season. As night falls the Crepuscular Lepidoptera take the place of the Butterflies, hovering about the trees, and flying swiftly as hawks between them. The curious blue moth, known as the Matheran butterfly, though abroad so early, is also a creature of the dusk ; and when the darkness has fallen, innumerable nocturnal species flit about the trees, entering often the rooms and verandahs of houses, where they are found studding the white ceiling-cloths early in the morning.

Following the arrangement of Horsfield and Moore, and lamenting that their beautiful illustrative plates are so inaccessible, while the exquisite drawings supplied by Mr. Hunter are too costly for reproduction on a scale so limited, the first Family, or Stirps, to be noticed is that of the *Lycænidæ*. It is composed of small but brightly coloured butterflies, much marked with delicate lines, whence their name of Hair-streaks ; and although not many species are met with, these few are in legions, and the list of them is always enlarging. Among the most conspicuous are two species of the leading Genus Lycæna, *Rosimon* and *Ælianus*, the former white or greyish-blue, and shining

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like silver. All the wings are margined with a dark border, and they are much marked with spots, rings, and lunules. The lower wings are crossed by a black band, and on the under surface of all the markings appear even more distinctly than above. The body is black above and white below, with bands on the belly, and the antennæ are ringed with white. *Ælianus* again is milk-white, bordered with brown, and has markings so elaborate that, without Horsfield at hand, or some much-needed manual of Indian entomology, no description that we have space for will suffice to represent the variety of its colours. The same remark holds good with regard to the genus *Aphnœus*, of which there are two species, *Etolus* and *Lohita*, described at great length by Horsfield, and of *Dipsas etolus*, another of the darker-coloured *Lycænidæ* that has been recognised among the multitude.

Of greater size, but less varied in colour, the family of the Pieridæ occurs also in vast numbers, and the splendid Papilionidæ rank along with them. The former are known as Whites and Yellows in homely phrase, these being their prevailing colours, though the wings are often spotted and margined with black. A familiar example is the *Callidryas hilaria*, of a pale yellow, with a narrow margin of black on the fore-wings of the male, while the female shows a wider border of the same, and spots within it. The hind-wings of the latter are also dotted on the margin, and have two small circular marks in their centre. *C.*

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Philippina is another common yellow one, and *Pieris Paulina* the ordinary representative of the whites.

Much more attractive are the brilliant Papilios, of which a number of species have been distinguished. The slow-flying *Papilio polymnestor* is the largest of its kind, measuring five or six inches between the tips of its wings. The upper ones are black, with long, slanting marks of light blue, and the lower blue, with spots of black. *Papilio Romulus* is very nearly as large. The ground colour is black, with numerous white streaks on the outer two-thirds of the upper wings; the lower are also streaked, and have coloured lunules along their borders, while the tail is well developed. *Papilio pammon*, very differently marked, having yellow dots in pairs along the outer margin of the upper wings, and a band of white patches crossing the lower, is said to be its female. *Papilio polites* is somewhat smaller, and has hues of bronze on the black upper wings, while the blocks of white on the lower ones are grouped in their centre, with red lunules between them and the margin. *Papilio Agamemnon*, again, is quite differently coloured, being blotched all over with brown and green; the tail is distinct, and it has a rapid flight. Epius is a Papilio of wide distribution, and feeds in great numbers on the wild lime in November; its prevailing colours are brown and yellow, and they are arranged in blotches somewhat as in Agamemnon. The rows of dots at the bases of the upper wings, and the blue ocelli on the lower, are

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characteristic marks; and it has no tail. *Papilio sarpedon* is even more widely spread than Epius, extending to the most eastern islands of the Malay Archipelago; it is smaller than any of the others, and has long tapering fore-wings, which are black, with an irregular band of white crossing nearly their whole extent from above downwards; this is continued to the lower ones, which are dotted near the outer edges, and slightly tailed.

The extensive family of Danaidæ form the third Stirps, and is more abundant in species than any of the others. They are often of plain colours, but some of the most beautiful Butterflies on the hill are among them. The Euplæas, *Plexippus*, and *Chyrsippus*, when they first emerge from the chrysalis, are remarkable for the richness of their hues, while the colours of *Euplæa careta* and others are quite plain. *Danais limoniace* and *D. aglœa* are prettily streaked and spotted with black and white. *Precis iphita*, and the three Junonias, *Asterias*, *Limonias*, and *Ænone*, show richer markings, and have finely cut and curved wings, while the two Diademas, *Misippus* and *Bolina*, especially the former, vie with the Papilios in the richness of their colouring. Both illustrate in a striking manner what has been called Mimicry among butterflies. The male Misippus is a handsome and conspicuous insect, sometimes called the Argus, from the large blue spots upon its wings, while the female is of quite different hues, and bears the closest re-

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semblance to *Danais chrysippus*, with which it frequently associates. This Danais and the Euplæa, to which the female Bolina assumes a likeness, are said to be protected from the attacks of their enemies by a peculiar flavour, which they have in common with some other members of the Family, and the Diademas, having the same coloration, though not so protected, escape in the crowd. The other members of this family that have been recognised are *Ergolis Ariadne*, the male of a light chocolate colour, and banded with wavy black lines; the female darker in hue, and both with prettily cut wings. It is rather rare, but two others, *Athyma lencothoes* and *Neptis acera*, both black with cross markings of white, and distinguished from one another chiefly by their size, are very common—especially the latter, which is the smaller of the two. There is also the *Vanessa callirhoe*, which bears a strong resemblance to the English Tortoise-shells, a group noted for its age, seeing that a specimen, with the markings distinct, has been found fossilised well down in the Tertiary strata.

In the fourth Stirps, the Nymphalidæ, are some lovely creatures; and a leading beauty among them is the *Kallima Inachus*. This species is as remarkable for its bearing a protective resemblance to a leaf, as the Diademas for their mimicry of other butterflies. It is seen in all Collections from the Himalayas, but is rare at Matheran; and, on account of its swift flight, and its habit of concealing itself among dead leaves,

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most difficult to capture. It varies in its colour even in the upper wings ; and below, so much do they differ that hardly two are caught corresponding precisely in their markings. Every variation, however, would seem to have in view the protection of the insect, as they are all imitative of the changes that occur in decaying leaves, among which they shelter themselves. Specimens from Cashmere and the Punjab have the tips of the fore-wings orange, while those seen here have a bluish tinge over their outer third ; but it is probable that, on examining more of them, they will be found to vary at Matheran as elsewhere. Other species of the Nymphalidæ are *Amathusia Bernardi*, and *Debis nilgiriensis*, which have caterpillars most remarkable for their hairiness. Like numbers of the larvæ of this and other families, they go by the name of " Kumlì Kìrìs," which is equivalent to Woolly-Bears in English. The *Charaxes athamus* represents "the Pasha with two tails " of Europe ; it has some resemblance to *Papilio sarpedon* in its markings, and equals it in the elegance of its form, to which the tails are an additional grace. *Melanitis leda*, *Mycalesis polydecta*, and *Hypanis ilythia* are also met with ; they are of average size and rather plain colours, but ornamented with bands and spots and large ocelli, that add greatly to their beauty.

The last Stirps is that of the Hesperidæ. They are a small family at Matheran, but the only two species identified, *agna* and *folus*, dull in their hues, and the

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latter much marked with white, are common enough. They are restless little creatures, having no fear of the sun. Even when alighted and feeding they are in motion, sideling about with wings half raised, much after the fashion of the Fan-tailed family of Birds.

Among Crepuscular Lepidoptera we have the *Sesia hylas*, or Clear-wing; *Acherontia styx*, or Death's-head, so widely spread over the world; and the *Sphinx convolvuli*, which bears a close resemblance to the English one. The two Chærocampas, *clotho* and *celerio*, are also here, and *Daphnis Nerii*, the Marble Hawk-moth of Bombay. The well-known caterpillars are very destructive to the rose-bushes, the leaves of which they fancy most for their food; and, while one is yet unused to them, it requires some courage to pluck a flower from before them, so grotesquely threatening is their attitude.

Another Crepuscular Family, the Castnii, among which are found *Ægocera maculata*, and the two Eusemias, *dentatrix* and *transversa*, is the most characteristic of all. The last of these is in such abundance as is not known elsewhere; as already mentioned, they may be seen at any hour of the day; but the afternoon is their favourite time, and they remain out till evening. The male is smaller than the female, and it has yellow markings round the margins of the lower wings that are absent in the latter, but otherwise they are much alike. There are two or three Syntomas

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of the Family of the Zygænidæ—*bicineta* being the common one; it has black and white blotches on its wings, the lower ones being very diminutive, and the body is marked by three yellow bands.

The interesting tribe of the Bombycites is the leading one among the Nocturnal moths; the family of the Lithosias being conspicuous for their numbers, and the Saturnias for their great size. *Lithosia entella* is a curious little creature, buff-coloured and with dark-green, nearly black, cross bars on its upper wings. When it settles, it wraps itself up as with a cloak, and is so disguised as to look more like a chrysalis than a living moth. *Nyctemera alternans* is another of the same family; and the Deiopleias, *syringa* and *pulchella*, the one being of good size, —orange and gray with black spots—and the other small, with wings like lace, finely dotted with red and black; there is also a double-headed band of black near the margin of the lower wing. Besides these a pretty little Bizona is seen, white and striped with red on the upper wings, the lower being yellow. Of other families are *Spilosoma suffusa*, orange and yellow, dotted with black on the wings, the body being bright red, marked by a row of spots and tipped with yellow. *Alope ocellifera*, spotted like a leopard on the dark brown thorax and upper wings, and the lower rosy red dashed with black, while the body also is rosy and tipped with yellow. To these may be added *Candyba punctata*, the sphinx-like *Ganisa postica*, and

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the large *Attacus atlas* of the Saturnias. The last has triangular wings of a brown colour, variously marked and strongly shaded, with transparent tale-like spots on them. *Saturnia mylitta*, or *Antheræa paphia*, as it is more strictly called, is also on the hill, and the leaves of the *Zizyphus rugosa*, so abundant everywhere, is said to be its food; while one more, the finest of all, is doubtfully added. This, the *Actæus silene*, light green, and with long tails to the lower wings, is not known to have been seen at Matheran; but it has a very wide distribution, and has been found by Mr. Dalzell, at Dapoori, settled on the *Phajus alba*, a rare orchid of the hill already alluded to, for which it is the only locality known in Western India; although it has just been ascertained that the same plant is pretty commonly distributed in its most eastern regions.

The tribe of the Noctuites is still more numerous in species than the last, though its interest is less than that of the Silk-worm group. *Patula macrops*, the Erebus or Peacock-moth, is conspicuous among them, and is often seen on the walls of a room in the early morning. *Argiva hieroglyphica*, of the same family, is also of large size, and both are of a dull brown colour, marked more or less distinctly with ocelli. The latter is the more rare of the two. *Potomorpha Manlia* and *Ophideres materna*, belong to another Family; they are fine creatures both, though bearing such hard names, the former of dark-brown and blue

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colours, and the latter of lighter hues, having orange-coloured lower wings spotted with black in the middle, and edged with a border of the same picked out with white spots. *Halodes carunca*, of the Bendidæ, is a fawn-coloured Noctua, shaded with brown down to a white band that crosses the wings from tip to tip; below the band the colour is lighter, and the lower wings are waved on the edges. The Family of the Ophusias is represented by *Ophusia properata*, which is finely marked with symmetrical bands and blotches of black and white; and by the *Lagoptera dotata*, *Achæa melicerta*, and *Achæa cyllota*, all handsome moths, with colouration somewhat similar.

The last Tribe is that of the Geometrites. Few species have been recognised; but, as the Looper-caterpillars are common enough, more, no doubt, will be found. The *Comibæna devexata* of the Geometridæ is a beautiful little moth of a rich green colour, finely marked with lines of brown; and *Eumalia Rosalia* of the Polygadæ, not well named, seeing that its prevailing hue is yellow, and the spots on it rather brick-red than rosy. These, and the small *Orsabana*, which flutters over the globe-lamps in the evenings, curling up its wings like tea-leaves when at rest, are all that we have succeeded in naming. In the absence of drawings, even this list is tedious; but it will rapidly lengthen, and the want be felt the more; while, were these to be supplied, and at the same time a classified collection of the typical species of Western India

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placed for comparison in the Asiatic Society's Museum at Bombay, a knowledge of these and other insects would be readily attainable. In transmitting butterflies and moths from place to place, even from India to England, it is worth knowing that no cases are needed. They may be safely entrusted to thick blotting-paper, folding the wings, and turning back the antennæ for protection between them and the body. These are Mr. Moore's instructions for the Lepidoptera, and they would probably be equally applicable to all other winged insects with long antennæ, and to the whole class, if modified in accordance with their structure.

SECOND ORDER.—*Hymenoptera.*—Many species of Ants—red, black, and russet coloured—abound on the hill, whose strange and complex economy forms a subject of the highest interest; but their history, as well as that of the Hive Bees, has been most eloquently told in books that are accessible to all, and need not be repeated here. They are of the same kinds as are seen in the plains, and one only of the Mason family claims special notice because of its nest, which is suspended from the branches of the Ghela and Khanta Kùmli trees in all parts of the jungle. This dwelling of theirs is usually a foot or more in diameter, and round or oval in form; outwardly it looks as if thatched with overlapping leaves plastered on its surface, and, when divided, has the appearance of a

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coarse sponge, irregular galleries and pillars permeating and supporting the structure in all directions. It adheres with such tenacity to the branch that no storm can detach it, and the tiled surface, simulating leaves, is proof against the heaviest monsoon. It has usually a deserted look, no movement being visible; but when disturbed, as by thrusting a stick into it, in a moment the vicious little creatures sally out in prodigious numbers, running about with their bodies turned up like the rove-beetles, and biting furiously when they can reach the intruder. These, no less than the other kinds, appear to increase in number in inverse proportion to the severity of the monsoon; so that the useful little creatures are most plentiful in the very seasons their services are most urgently required. Of the many families of this order, a few only can be selected for mention, and that very briefly. Among them may be named that of the Pupivoræ, which includes the Ichneumons, so famous for their habit of depositing their eggs in the larvæ of other insects, chiefly noxious ones, and thus keeping them in check. None have as yet been identified; and the common one, though it appears in the collections at the British Museum, is still without a name. Another of the pupa-eaters is the *Stilbum splendens*, rather stout of body, and of an exquisite green colour; and there is also a small species of Chrysis, tinted with green and golden yellow. Some of them deposit their eggs in the dwellings, not in the body, of other

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insects, like the Ichneumons, but in their own way are equally destructive to them.

The family of the Fossores is the most characteristic of all the Hymenoptera, the red soil of Matheran forming excellent material for the construction of their nests, and caterpillars being in plenty for the supply of food to their young. A good many species have been named, and the *Sphex ferruginea*, about an inch long, with a narrow waist about a tenth of its whole length, its general colour ashy and chocolate, is the most common of all; there are two narrow bands of yellow behind the wings, and a tinge of the same on the last joints of the hind legs. Two species of Scolia are seen: one small, with gauzy grey wings, and the body banded with black and yellow; the other of great size, and armed with a most formidable sting. This, the *Scolia rubiginosa*, measures one and three-quarter inches in length, and two and a half from tip to tip of the extended wings. The colour is black, with the exception of the last four or five segments of the abdomen, which have a reddish hue. It frequently enters houses, and when seen buzzing about a child's head creates as much alarm as a Snake or a Scorpion. Of the genus Pompilus are the species *Cæruleus*, the body of which is blue-black, wings fawn-coloured, and the legs chocolate; Pompilus, or *Mygnimia perplexa*, having yellow wings tipped with olive-green, antennæ also yellow, while the body is black, and the legs brown; as well as a third species

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of the same genus, varied all over with dull ashy and chocolate.

Belonging to other genera are the comparatively large *Chlorien lobatum*, having a green body crossed with black, legs of the same colour, and yellow wings tipped with olive-green, the narrow waist being shorter than usual; and the three Pelopæi, *Bengalensis*, *Spinolæ* and *Coromandelicus*, all very long waisted. The first, small and of delicate structure, has yellowish wings tipped with dark ashy, while the body and legs are of a dingy green; the second has its yellow wings striated with grey, a black body, and the thighs of the hind legs bright primrose yellow, while the long thin waist is chocolate, with a tinge of the same; and the last, or Coromandel one, over an inch long, has the body black, legs chocolate, and wings yellow. It is a constant amusement to watch the Sphex and its congeners preparing their mud nests, which are gathered together in small clumps on the walls and rafters of houses, sometimes in a keyhole, and very often in the little openings by the side of a couch, in which the pins of the footboard rest. When completed they introduce one or more caterpillars into each as food for their young, close the opening, and leave them for good.

The true wasps, or Vespidæ, are represented by *Vespa cincta*, a huge creature, without a distinct waist, and having dark yellow wings, black body, and brown legs, with a broad yellow band encircling the abdo-

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men, and by two species of Eumenes, *petiolata* and *flavapicta*. The hues of the former are a prevailing yellow, the thorax, waist, and legs chocolate, and black bands on the abdomen; while the latter has a black thorax, and waist, marked with lines and spots of yellow, and the abdomen banded much in the same way. The long waists of both bulge out below, and in this respect differ from those of the Pelopæi, which are of nearly uniform diameter throughout.

Among the Apidæ are several species of Honey-Bee, this *Apis Indica* being the common one. *Apis dorsalis* is also seen, and a stingless variety is said to be found in the neighbouring jungles. The first may often be observed swarming, and they usually attach themselves to a branch of a tree at a safe height; but they have been seen clustered on a tent-peg in the midst of a camp, and with half a dozen horses picketed in their immediate neighbourhood. Great caution is needed on such occasions, for if even one of them is killed the consequences may be serious. An instance of their aggressiveness has been heard related by one of a boating-party on the Nerbudda. A swarm was flying over them, and a few of the bees alighting on the gunwale of the boat one of them was thoughtlessly fillipped into the river; in a moment the party was attacked, and although they rowed with all speed to the bank and ran for their lives, they suffered severely, and the half-naked boatmen were dangerously stung. Dr. Wilson, a faithful recorder of his

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experiences in jungle life, illustrates also the fury that possesses them, when he relates that once he was subjected to it himself, and came out of the assault with seven and twenty stings implanted in his nose. The poison of bees and wasps is fatal to their own kind, as well as to their enemies of other families. Even the Queens can inflict deadly wounds on one another, from which it would appear that their venom, unlike that of Snakes, affects fatally those even that secrete it most abundantly. There is no domestication of the honey-bees among the hill people, but small quantities of excellent honey, collected in the jungle, can usually be purchased through the Kotwal from the Thàkurs. Several kinds of the Xylocapa, or Carpenter Bee, are met with; *Xylocapa Olivieri*, of light brown and yellow hues, and *Xylocapa flavo-nigrescens*, bright yellow on the thorax, with ashy wings, and body of a darker hue, are seen occasionally; while *Xylocapa tenuiscapa* is in great abundance. The wings of this bee are greenish-ashy, and the body of a dark blue, that flashes like steel in the sunshine. The male has the terminal joint of the fore-feet yellow, and is thus distinguished from the female, whose limbs are ashy throughout. The carpenter bees are all solitary, but colonies of them build their nests independently in the decayed trunks of trees, hollowing them into long canals for the accommodation of their young. In the old Hamal Lines is one riddled like a target by the *Xylocapa tenuiscapa*.

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On tapping it, and applying the ear, the whole trunk is alive with their buzzing, and they come out in numbers, provoked, it may be, but making no direct attack like the ordinary hive one. Their usual flight is slow and heavy, and they turn with difficulty; but when going in a straight line, they can fly with great speed as soon as they are fairly under way.

Of somewhat similiar habits are another genus, to which belongs the *Anthophora zonata*, a common enough bee, not much larger than the honey one, that makes its nest in the ground or in the crevices of old walls. It has light grey wings, yellow thorax shaped like a shield, the body striped black and green, and the head brown, with a long yellow trunk. A species of Anthidium, very prettily marked, and the *Crocisa decora*, ornamented with stripes of blue on the body and legs, are also among the Bees of the hill.

THIRD ORDER.—*Neuroptera*.—The Termites, that live in societies like the Ants and Bees, find in the red soil here an excellent material for the construction of their nests. The mud they form from it is so finely triturated as to make the best of plasters for a temporary wall, and when mixed with tar or some of its products is rarely disturbed by these or any other insects. The astonishing fecundity of the monstrous Queens is one of the wonders of natural history, and in digging them out, it often happens that more than

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one will be found apparently belonging to the same community. The swarming of the winged males and females is a curious sight, and brings together many kinds of bats, birds, and other creatures that are wont to feed upon them. They have many traits of character full of interest, and, did space permit, most tempting to dwell upon; but with nothing new to say, it is needless to repeat their oft-told tale. By far the most conspicuous of this Order are the Libellulæ, or Dragon-Flies, the hawks and eagles of the insect world, as they may well be called. They are always to be seen dashing about the reservoirs at mid-day, and have often been watched from under the shelter of a large fig-tree that grows by the Mhar spring. The finest belongs to the genus *Ashna*, and measures about three inches in length, and still more in expanse of wing; its flight is very powerful and swifter than a swallow's, while the colour of its thorax and body glisten like burnished steel in the bright sunlight. It has brown and yellow tints on the head, green banded with black on the thorax; the body is yellow, variegated with black, and the wings clear and membranous. A species of Agarion is also common, much smaller in its dimensions, with very prominent eyes, and clear short wings. On its thorax is a green oval ring on a ground colour of dark brown, and the body is black and brown, banded with blue and yellow.

There are several of the Myrmeleonides, or Ant-

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Lion Family. *Myrmeleo zebratus* is a fine creature, with wings of great expanse, and of a lace-like structure. They are spotted with black, brown, and yellow marks, of irregular form and arrangement ; the thorax and body are black, with yellow linear markings on the former ; the eyes of a bright yellow ; and the sexes are distinguished by the forked tail of the male. *Myrmeleo contrarius* has similar wings, but mottled with brown only, and the elongated body is of the same colour as the spots on the wings, with narrow black bands crossing it at intervals. Much smaller than these is a third species, still unnamed, of a stone colour throughout, the thorax and body being of a darker shade. Ascalaphi also are frequently seen flying about with great vigour, and feathering their wings like oars when they alight, even more conspicuously than the dragon-flies. All their wings, but more especially the lower ones, are broadly and prominently veined, the antennæ are long and clubbed, and the bodies shaggy with hair. *Ascalaphus accusans*, *segmentator*, *insimulans*, and *tessellatus* are the species that have been recognised ; but in Dr. Leith's fine collection are a number of this and other Families that will be named when the revision of the whole order is completed. The larvæ of the Neuroptera are very curious. Those of the dragon-flies are aquatic, and often seen in the still pools about the Bunds. They have the head, and nearly the body, of the perfect insect, and the strange pincers they protrude

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like a mask to seize their prey are of great power. The traps of the young ant-lions are not less remarkable, and the larvæ of the Ascalaphi are as odd-looking as the others.

FOURTH ORDER.—*Orthoptera.*—In this are included some of the most strangely formed, most noisy, and most destructive of the whole Insect race. Earwigs and Cockroaches, active in all stages of their life, are abundant. The genus Acheta is represented by several species, and among commoner kinds will probably be found the grotesque-looking *Acheta monstrosa* of the Deccan. There are the usual varieties of the Gryllus and one besides of great size, measuring about five inches in the expanse of its wings, hardly seen elsewhere. Its colour is green, only the fore-wings are tipped with yellow, which gives it a close resemblance to a leaf just beginning to decay. That true cosmopolitan, the *Gryollotalpa vulgaris*, or Mole Cricket, the history of which, as told by Curtis and others, is so full of interest, is here also. The common Locust of the hill is an inch and a half long, and has yellow and black bands on the wings. Larger kinds are rare, and no regular invasion of the migratory sort has taken place here of late years. The power of flight they exhibit at these times is remarkable, seeing that their usual movement is merely a spring on the ground; and it has been noted that the same is true also of migratory birds, as the Quail, Hoopoo, and

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others, whose flight is short when their wanderings are over. A beautifully-coloured species of the Locust family is the *Œdipoda citrina*, nearly of the same size, though of a more delicate form than the ordinary one. The upper wings are about three inches in expanse, variously marked with different shades of brown, white, and fawn; the lower fan-like, with bright yellow, black, and fawn markings, while the two last joints of the hind legs are red. The true Locusts are known by their short antennæ from the Crickets and Grasshoppers, and by the absence of the long auger-like ovipositor common to the females of the latter families. There is also a marked distinction in the stridulating apparatus of the males, each group having a variety of its own. The Mantidæ are well represented, and the common species closely resemble, if they are not identical with, the *Mantis religiosa* and *Blepharis mendica* of other regions in size, form, and habits. *Mantis ocellaria*, and a small dark-coloured one likewise, appear at times on the table by gaslight; and the finest of all, a true Turnus among its fellows, overtopping them easily by head and shoulders, is a species of Popa, that awaits its specific name. Its whole length is over four inches; the wings are short, the upper being light brown and of an oval form, marked with black at the tips, a band of the same about the middle, and a round patch of black close to the thorax, while their upper border is of a bright yellow; the lower ones, equally

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short, are black and white streaked; they are rounded on their lower edges, and have a light brown spot on the outer angles. The thorax, dark brown like the body, supports two powerful fore-legs, and below the junction are two crescent-shaped yellow spots. The eyes are enormous, and the expression, set off with rather lengthy antennæ, simply fiendish.

The Phasmidæ are equally common. A large species of the genus Phyllium frequents the trees, and is seen either resting, or moving with great gentleness and caution in search of its prey. There are also a number of smaller ones that are wingless, and as with the Mantidæ so with these, there is one pre-eminent among them for its size and strength. This is the *Phasma Maculicollis*, about three inches long, and of a dark brown colour; the expanse of the wings is four and a half inches, with two small tippets, under which is a red mark close to the body. The male is a third smaller, with the same mark, and wants two yellow bands that are seen on the female, one encircling the neck, and the other behind the insertion of the fore-legs. The Empusæ, with leaflets on the limbs, common in Bombay, have not been found; but very probably *Empusa gongyloides*, with fringes and ruffles on all its joints, is among the *Orthoptera* of the hill, with many other groups besides those selected for mention as being the most conspicuous, and obtained without much search after them.

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FIFTH ORDER.—*Hemiptera.*—These have been more carefully classified, but are hedged about with such a stockade of six-footed words in their nomenclature, that, without the help of the drawings that are at hand, it is labour lost to attempt a description of them. They are represented on the hill in many forms, including creatures so unlike as the Cicada, the plant-bug, and the Water-boatman. The great *Cicada ducalis* is the chief of the group. It is two inches in length, and thick in proportion; its colour black, and marked with yellow on the head and body, while the membranous wings are edged prettily with green. About two o'clock in the day its screeching is at its height, and when resting on a tree close by the noise is deafening. It lasts some time too, and it is matter of wonder to notice with how little apparent exertion a sound so intense and penetrating is produced. The organ of stridulation has been minutely described, and is much more complex in its structure than those of the crickets and grasshoppers; but here it will suffice to say that its main feature consists in the alternate stretching and relaxation of a parchment-like membrane, acted on by muscles that must be endued with a vital force of the most marvellous activity. Of the same family are *Cephaloxys locusta* and *Hacchys splendidula*, while *Ophœna dives*, large like them, but with opaque brown instead of clear wings, bears also somewhat the appearance of a Cicada. These all belong to the *Homopterous* Divi-

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sion of the Order, and there are numbers of the smaller genera, *Tettigonia*, *Ptyclus*, *Cixius*, *Pœciloptera*, and others, that are included in the same. The Heteroptera are no less plentifully represented. Among the family of the Pachycoridæ are *Scutellera nobilis* and *Callidea purpurea*, the former of a brilliant green, and both with elytra covering the body, and giving them the appearance of beetles. *Canthecoma furcillata* is very common; it congregates in heaps on the beeves of the Dhindi, and flies lazily away when disturbed; its colours are very plain, varied only with a three-cornered black mark on the wings when they are folded. This and the rugged *Caziera verrucosa* are of the family of the Asopidæ, and they are both of medium size. Among the Pentatomas may be named *Placosternum taurus*, with elytra and thorax light brown, and a heart-shaped figure of the same hue on the back, which is red, and has a yellow band round its margin, spotted with black. There are two Raphigasters, one of brown hues, and having the abdomen margined with yellow and black; the other, or *geniculatus*, light green, but varying in shade, with red markings behind the thorax, and the elytra tipped with grey. These are all of a goodly size, and in addition to them are a number of smaller ones belonging to the same extensive group, such as *Mormidea socia*, *Eysarcoris dubius*, and a few besides that are even more minute. The Mictidæ are also a numerous family, represented by *Physomerus calcar*, a very

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handsome insect, about an inch long, of a dark ashy colour, finely banded with yellow on the wings, thorax, and legs; the abdomen is brick-red, antennæ long, and the curved hind limbs strongly armed with spurs. There is also a species of Machtima, brown on the wings and thorax, with a black mark behind the latter, and the abdomen is red, tipped with black, and narrowly banded with the same. *Mictis lata*, *bovipes*, *dentipes*, and *punctum* may likewise be named, and *Dalader planiventris*, of the same family. *Gonocerus lanciger*, a pretty little creature, variously marked with yellow and brown, belongs to the Coreidæ; it, and *Lygæus militaris*, of a bright scarlet, the wings being tipped with grey and marked with a white spot, are common. Others also of the Lygæidæ are seen small and varied in their hues, as well as some bright-red Pyrrhocoridæ; and many representatives of the family of the Reduvii and near allies will reward the search of the entomologist, when this Order as it prevails on the hill comes to be carefully and systematically investigated.

SIXTH ORDER. — *Diptera.* — The classification of these and of the Coleoptera is still incomplete in the British Museum, and the great collections at the India Office remain buried in cellars until a place can be prepared for them. We must follow therefore the old landmarks, and should reproach attach to this meagre outline, there are most capacious shoulders to

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lay it on, that are already moving in the matter, and will throw it off in a year or two.

The Diptera are in vast numbers on flowers, and on refuse of every kind, feeding on both, and, in the latter case, carrying on a useful work by removing all that is hurtful and impure. The division of the Nemocera, which includes Gnats, Mosquitoes, and Tipulæ, are not very largely represented; but the common plague of the plains would seem to be on the increase, not because the place is suited for them, but owing to their being brought up in numbers from below. It was constantly noticed that a visitor from Bombay left a few behind him that had been wrapt up in the folds of his bedding, and set free when it was spread out. In early years the curtains now in general use were hardly thought of for mosquitoes, however useful they might be as a partial protection from rats and snakes, but, as they become more and more indispensable, the conclusion is that these enemies of sound sleep are year by year mustering in greater force. Swarms of Tipulæ are occasionally observed, the smaller kinds performing their vertical dance in the air, and the larger, like Daddy Longlegs, dragging themselves through the long grass, or taking short flights in the air. The habits of these insects are active in all stages of their existence, the larvæ and pupæ being often aquatic. Their structure is admirably adapted to their various modes of life, and the larvæ of some of them are even said to be fertile.

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The division of the Brachycera are much more numerous, and many groups of them are represented. A Tabanus (?) is very conspicuous early in October, with the colouration of a wasp, but much more compact in its figure, and armed with a formidable sucker. It often poises itself about a horse's flanks, threatening though seldom inflicting a severe wound ; but it is the female only that has the habits of a blood-sucker, her mate devoting himself to the suction of flowers.

Anthrax, Bombylius, and other genera of the Tanystomæ are commonly seen ; one of the first, of large size with dark brown thorax, wings of a lighter hue of the same, and banded with yellow and black on the body, is common ; it has a short concealed trunk, and is hairy about the roots of the wings. The Bombylii are so named from their tufted bodies, a peculiarity very marked in some species ; they hover about flowers in the glades of the woods when the sun is at its brightest, and usually extract their food without settling. *Asilus Tauranus*, with black thorax and body, the latter banded with yellow, light wings tinged with red, and the thighs of the hind-legs coloured in the same way, and another thin-bodied species of the same genus of similar hues, have been noticed, though in no great numbers. Among the Dichœta group the Gad-flies abound, and at some seasons are troublesome. The Muscidæ proper are in vast numbers, especially the Sarcophaga, with violet hues on the body, and light filmy wings, Stomoxys, Musca,

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Calliphora, or meat-fly, and many other genera. Leaves are often seen riddled by the mining Diptera; and in the damp nullahs swarms of the *Diopsis Sykesii*, or telescope-fly, are everywhere met with, while the Eye-fly, common in the plains and in other hill-stations, is rare. The former is named from having its eyes raised on long stalks, and the latter from its persistent and troublesome fancy for admiring itself in one's pupil, and getting drowned in tears.

The SEVENTH and last ORDER, that of the *Coleoptera*, can only be noticed in the same cursory way. They are less prevalent than many other Insects, and the reason may be that no wood is left to decay on the ground, a condition that is essential to the prolific existence of many families among them.

One of the largest and most conspicuous is the *Butocera rubra*, a kind of Capricorn beetle. It is frequently seen buzzing about rooms at night, and settled on the walls in the early morning. Its length is about two inches, and it has enormous jointed antennæ; there is a sharp spike on each side of the thorax, and this part is also marked with two red crescent-shaped spots in the middle; besides these there are whitish marks at the back of the head and thorax, while the elytra are freckled with black, and have three distinct red spots on each. Equally large, but of darker hues, with highly serrated antennæ,

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and doubly spiked on each side of the thorax, is the *Prionus orientalis;* and there is another of the Cerambycidæ, much like the preceding in size, of a dark brown throughout, and single-spiked on the sides of the thorax, as in Butocera. A large Scarabæus, with the powerful horns of many of the family, also enters the houses; and there are hundreds of Chafers abroad as the sun goes down, flying round the tops of the trees with a humming noise, compared by Mr. Hunter to that made by the Hannals in the distance as they are ascending the Ghaut. *Anomala elata*, and two more species of the same genus, are common among them. The Buprestidæ, of moderate size and oval form, commonly called Golden Beetles; and representatives of the large Family of the Cetonias, are plentiful, especially *Cetonia albomaculata*, and many that have not been identified. The Cicindelites are very handsome also, usually with brilliant metallic colours, that are apt to fade as they dry. Elaters or Click Beetles are seen leaping about, and the mechanism by which they spring so nimbly is worth examining. There are long-snouted Curculios hanging on the stems of the grass, and the little richly-coloured Cassidæ are common; the useful Lady-birds also, spotted in many ways; and the curiously-armed Bombardiers. Blister-flies make themselves unpleasantly felt, and the brilliancy of the Fireflies, after the first rain has fallen, is perhaps unequalled in any part of India. The common Lampyris belongs to the

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genus Calophotia, but two other species found at Khandalla are probably here also. Among the Paussidæ are *Paussus Hearseyianus*, named after the gallant old soldier, who would have given chase to a fine insect with scarcely less ardour than to an enemy in the field. This, and the other members of the family, are curious little beetles, with antennæ terminating in cups, or branching out like horns; and a bright-red one, with a black band across the elytra, has its head supported on a long neck that gives it the semblance of a diminutive Mantis. They split and roll leaves up to make their nests, that of the last being a tube about an inch long, and as thick as a pencil. The small Hispa, with tufts of hair on its body, is the last of the Land Beetles to be mentioned: and there are many species of Dysticidæ, Hydrophili, and other families in the waters of the streamlets and reservoirs that have yet to be identified.

CONCLUSION.

With this outline of the Insects of the hill, our work closes. Its aim has been to give form and body to the emotions of delight inspired by the sweet sounds and pleasant sights of nature. It may further furnish materials for comparison hereafter with the same forms of life on the hills around, and thus bear a part in solving questions of another kind. Such are the old limits of land and water, the relations of the islands to the mainland, their periods of separation and other

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matters, illustrated by the study of Alpine plants, for instance, on our Scottish hills, and at great length by Mr. Wallace in his most interesting History of the Malay Archipelago.

The exquisite balance of animal and vegetable life at Matheran, by which the air of its jungles is kept so sweet and pure, will, it is hoped, be maintained with the most jealous care; and on behalf of the Native Tribes dwelling around, all destitute in the highest sense, and many in the lowest, our prayer is that Government will further "consider the poor." Fair recompense, it is believed, was given them, and a thoughtful care shown for their future welfare, when the hill was turned to English use. They were themselves pleased to have a market for their small produce, and brought it readily to the Bazar for sale or barter. All went well for a time, until the greedy and unscrupulous of the stronger race, actuated by love of gain, pushed their way among them. Whatever was amiable in their characters was outraged by contact with men like these, and the best of them became alienated, lost heart, and kept aloof from strangers. It is the usual tale of the Hill People; frank, honest, and kindly to one another, they fear and hate those who do violence to their best feelings; and though their discontent may find no outward expression, it is sad to think that they should be in any way injured and estranged by our presence among them. There are many Tribes from Gùjerat

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to Canara well worth caring for, and they much want a capable Officer to be their Guide and Protector—one not liable to be changed, and full of resources; who could aid them in their industry, direct their education, and, if need be, organise them into battalions. Such men have left their mark on kindred people in many parts of India, and others, from Chittagong westwards, are now carrying on the same high mission. Would that it were extended to these Tribes also, and a man like Outram among the Bhîls, Dickson among the Mhairs, or Yule among the Santals, sent to rule over them—one who, "with his four doors open," would be ever ready to offer sympathy and counsel.

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NOTES

ON

"MATHERAN HILL."

By J. Y. S.

CHAPTER I.

Note 1.—The name of Captain Ponsonby should have received more prominent mention as a pioneer in the opening up of the hill, as it appears from the slight sketch of Matheran drawn up by Mr. Bellasis, from the early records preserved at Tauna, that it was he who made the primary survey having in view a military sanatarium, laid out the main road, and marked the sites for a church, a hospital, a barrack for 200 men, a gaol, and other public buildings. Major Peacock's supplementary survey was made a year later. He traced other roads, and cleared them of jungle, marking out also with low stone walls the sites for private houses, which Mr. Malet was authorised to allot to the public. The latter were not, as a rule, to exceed five acres in extent, and they were to be chargeable with a rental of 5 rupees an acre. The top of the hill was roughly estimated to have the dimensions of 8 square miles of table land, or about 5000 acres, the best of which had belonged to the several villages at its foot—a strip having been apportioned to each for the buffaloes and goats to graze on during the hot season, when the pasturage in the plains became scarce.

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NOTE 2.—These uplands that had been held at a nominal rent were detached by the Survey Department in 1860, and formed into the new and distinct village of Matheran—Soondee Warra and Warosseh yielding the larger strips, and Maldoonga, Narel, Borgaum Khoord, and Bhaikreh the smaller.

NOTE 3.—In the completion of the Ghaut road, Mr. West, C.E., took a leading part under Lord Elphinstone, the cost of its construction amounting to Rs. 10,000, while an annual outlay of Rs. 1200 or more has since been required to keep it in repair. This being done, and many minor improvements made by the early Superintendents, Major Parkinson, Lieut. Parker, and Dr. Ward, the preparation of the map of the hill, as it now stands, was begun. The Station-Tullati was taken to Poona in 1864, and instructed in the work of surveying by Colonel Francis, who afterwards tested what was done, and gave his sanction to it on completion as being sufficiently accurate for all practical purposes. It was copied on a reduced scale for this work with the permission of Government, conveyed in a letter from Mr. Secretary Wyllie, of January 22nd, 1869, in the Photozincographic Office at Poona.

NOTE 4.—The annual revenues of Matheran are estimated at Rs. 10,000, consisting of the Government grant of Rs. 5000, rental of building sites, tolls, and sale proceeds of grass and firewood. By retaining the contracts for supplies of the two last, and for the Ghaut toll, in their own hands, the later Superintendents have materially added to their resources, and been able to present a better account of their stewardship than when all contracts were given out. Extra grants have been required, and made at times, though not always wisely spent, for the increase of the water supply, or other needful measures; but the most recent of the

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bunds, built by Dr. Simpson with money saved from revenue, is understood to be a great success. The cry, however, is still for water; and as with new men come new measures, the teachings of a costly experience as to the modes in which the rocks and soil part with their moisture as the season advances demand most careful study, so that in the future there shall be no record of the construction of "filters," or of bunds, that in the months of April and May retain nothing.

NOTE 5.—Much has been written of late on "The Influence of Trees on Climate," and there is a fair *résumé* of the conclusions arrived at in the September number of *Chambers' Journal* for 1876. In this matter the peculiar relations of the Ghauts and Konkan Hills to the monsoon have always to be kept in mind, as on them rain must fall heavily so long as the hot sun shines and the world goes round. Trees will not affect the quantity to any appreciable extent, but they will prevent or delay its escape; and zigzagging the ravines, or terracing where the soil is not too porous, as proposed by Dr. Niven, may possibly contribute to the same end, and keep the springs flowing longer than they are wont.

NOTE 6.—Just as the weathered trap hills of the Deccan and Konkan occasionally suggest the form of the Hindoo temple, so is the Moslem architecture mimicked in the mural precipices, white domes, and icy spires of "the Abode of snow." "It was," says Mr. Wilson, "passing strange thus to find the inorganic world anticipating on so gigantic a scale some of the loftiest efforts of human art; and it is far from unlikely that the builders of the Taj, and of the Pearl Mosque at Agra, only embodied in marble a dream of the snows of the Himalaya, or of the Hindu Khush."

NOTE 7.—The deep blue of the early morning atmosphere

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adds greatly to the beauty and impressiveness of the temple-like scenery of the Bawa-Mullung range; and one feels as if on holy ground when, looking on it from the Panorama Ridge in the early days of October, he sees the white waves of mist resting on the plains, until influenced by the sun's heat they rise in thin vapour, and, meeting its rays at the level, reflect, in the beautiful guise of the "Spectre of the Brocken," his own magnified image on the ascending cloud. So perfectly suited are the natural features of the hill for this spectacle near the Point, that, if mounted, the rider sees not only his own glorified figure, but that of his horse also, even to its feet, displayed on the rising vapour. From a similar position, the grand process of a thunderstorm from its commencement to its ending may be favourably witnessed, either at the opening or closing of the monsoon; while the fine evening effects of the latter season on the well-filled creeks of the Konkan must dwell long in the memory of all who have once seen them. Later, as the cold increases, and the atmosphere loses its uniform density, the sun, as he sinks into the ocean, passes from the grand to the grotesque —assuming often the form of an egg, a lamp-shade, or a butter-dish, until his setting is completed. A recent traveller, whose genial humour enlivens many an English household, was much struck by the unique features of the Matheran scenery, unequalled, he thought, in any other part of the world—even his own Riviera—in its peculiar way. It might be anticipating to say more, as it is hoped his own graceful pen and pencil will yet do justice to the subject.

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CHAPTER II.

NOTE 1.—The hill tribes of Matheran appear to be the remnants of a people that was widely spread in prehistoric times in India, though now confined for the most part to remote and hilly regions of the peninsula. Races allied to the Dhangurs especially are in large numbers in the Berars, in the hills on the northern bank of the Paingunga, and have been settled from time immemorial along the range of the Satpooras. They are known under the names of Dhangurs, Karumbars, Gaolies, &c., in these parts; and cognate races, such as Gonds, Kols, and many others, are still more widely scattered. They have affinities with the Polynesians and other Eastern peoples, and are represented in Europe by the Finns and Laplanders; and there is even a surmise, from specimens of Ceramic and other arts found in America; that in long bygone times an old race of the same blood may have found its way to that continent also.

NOTE 2.—A table of measurements is given below that may have interest for ethnologists; and it is curious to note that the names of the people, such as Honia, Roopia, and others, are repeated not only among races of the Malay Archipelago, but that in the land of Canaan Jacob's grandchildren bore appellations so nearly identical, that were Phallu, Carmi, Jamin, Zohar, or Shuni called for in an assembly of the tribes at Matheran, the chances are they would find owners and be acknowledged at once.

[TABLE.

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Bodily Measurements of the Matheran Hill Tribes, by D. Simpson, M.D., March 20th, 1873.

Number.	Names.	Country.	Age.	Height.	Weight.	Circumference Measurement.								Length Meas.				Caste.	Sex.
						Head.	Neck.	Chest.	Hip.	Thigh.	Calf.	Biceps.	Forearm.	Shoulder to Wrist.	Hand.	Length of Leg.	Foot.		
			yrs.	in.	lbs.	in.	in.	in.	in.	in.	n.	in.	in.	in.	in.	in.	in.		
1	Rama	Matheran.	35	66	119	21½	13	33	32	18½	13	9	8½	21	7	35	9½	Dhangur	Male
2	Bhagoo		28	66	114	22	13	32	32	18	12	10	8½	23	6½	34	10	,,	,,
3	Luckoo		30	65	100	21	12	32	32	17	11	9½	9½	22½	6	32	9	,,	,,
4	Rama		25	63	97	21½	13	30	30	16	11	9	9	22	6½	34	9½	,,	,,
5	Bhagoo		25	62	112	21	13	33	31	18	13	9½	9½	21	6	34	9	,,	,,
6	Zeema		10	54	57½	20	9½	25	25	13	9	6½	7	18	5	27	8	,,	Boy
7	Bhagee		5	41	31	14	9	20	20	10	7	5	5	13	4	22	6	,,	Girl
8	Cambulloo		40	61	104	20	12	32	32	18	11	10	9	20	6	34	9	Thakûr	Male
9	Vittoo		56	67	116	20	13	34	33	19	10	10	9	24	7	38	9	,,	,,
10	Cambulloo		30	66	108	21	12	32	33	19	11	11	9	24	8	41	9	,,	,,
11	Changa		29	63	99	21	12	31	32	17	10	9	9	22	8	38	9	,,	,,
12	Dawoo		35	70	124	21	13	33	33	18	12	10	10	24	9	37	9	,,	,,
13	Balla		32	62	104	21	12	34	30	18	11	9	9	21	7	37	9	,,	,,
14	Dama		27	62	109	22	12	33	31	18	11	9	8	22	7	26	9	,,	,,
15	Mahadeo		30	59	86	21	11	29	28	15	10	7	8	20	7	36	9	,,	,,
16	Govind		22	60	88	20	11	31	30	17	11	9	8½	22	7	36	9	,,	,,
17	Luxa		20	62	84	21	11	30	29	16	11	8	8	22	7	37	9	,,	,,
18	Balla		14	52	68	20	10	26	25	15	10	8	8	18	7	34	8½	,,	,,
19	Naga		17	55	80	21	11	29	27	16	10	8½	8	20	7	34	8½	,,	,,

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20	Hurjee	12	56	68	21	11	27	27	14	9	8	7½	20	6	34	8	,,	,,	
21	Rama	13	61	82	20½	12	28	30	16	10	8	8½	21	7	36	9	,,	,,	
22	Cambullee	26	57	84	21	11	29	33	19	10	8	7	19	7	35	8	,,	,,	Female
23	Thurnee	28	58	92	21	11	31	32	20	10	9	8	20	6	36	9	,,	,,	
24	Ghomee	24	59	92	21	11	30	31	20	11	9	8	21	7	37	8	,,	,,	
25	Raghee	21	59	100	22	12	32	34	20	11	9	8	22	7	38	9	,,	,,	
26	Cambullee	12	52	87	20	10	28	30	18	10	9	8	20	7	34	8	,,	,,	
27	Bhamee	9	40	52	20	9	23	24	13	9	7	6	17	5	30	7	,,	,,	Girl
28	Bhira	8	53	60½	20	10	25	26	14	9	7	7	19	6	30	7	,,	,,	Boy
29	Raojee	5	42	36	19	9	21	22	12	9	6	6	15	5	25	7	,,	,,	
30	Bhira	20	63	100	20	12	32	32	18	12	9	9	23	7	36	9½	Kutkuree	,,	Male
31	Jayana	22	64	115	21	12½	33	32½	17½	12	10	7½	23	6½	34½	9½	,,	,,	
32	Roopa	25	65	112	20	13	32½	32	18	12½	9½	9½	23	7	34	9½	,,	,,	
33	Bhira	18	63	108	21	12	31	32	18	12½	9	9	22	6	33	9½	,,	,,	
34	Unsan	22	64	117	20	13	33	32	18	11½	9½	9½	23	6½	34	10	,,	,,	
35	Ittoo	40	66	105	21	11½	31	32	16½	10½	9	9	23	7	34½	10	,,	,,	
36	Mahadeo	20	65	107	21	12	30	31	17	11½	9	9	23	6½	36	9½	,,	,,	
37	Burjee	18	60	97	22	12	30	32	20	10½	8	8	21	6	32	8	,,	,,	Female
38	Luckia	13	58	70	20	10	24½	27	18	9½	7	8	20	6	34	8½	,,	,,	
39	Lugonee	13	58	67	20	9½	26½	27½	15	9	7	7	21	6	35	9	,,	,,	
40	Luxumee	21	63	103	21	11	30	35	16	10	8	8	22½	6	37	9	,,	,,	
41	Thack	21	60	89	20	11	29	32	16	9½	8	8	21	6	36	8½	,,	,,	
42	Genjee	17	63	107½	21	11	30½	33	18	11½	9	9	21½	6½	37	9½	,,	,,	
43	Dawoojee	10	53	61	19½	10	25½	25½	13½	9½	6½	7	18	5½	28	8½	,,	,,	Boy
44	Hamunta	9	50	52	19	9	23	23	12½	8	6	6	17½	5	25	8	,,	,,	
45	Dhuckulla	8	51	46	19½	9	23	23	11	9	5	6	17	5	26	7½	,,	,,	
46	Tookia	5	46	35	18	8	21	21	9	7	4	5	16	4	21	7	,,	,,	

Matheran.

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NOTE 3.—The estimate given of the intelligence of the people is satisfactorily confirmed by the evidence of Mr. Grant Duff, which appeared in the *Contemporary Review* for May, 1875. Thinking apparently that it had been over-rated, "I called," he says, "the landlord of our hotel, and, with many misgivings, bade him select from the hardly-clothed barbarians who surrounded us those who knew the plants best. Then after having gathered a great quantity I asked them what they were, referring as I did so to the manuscript list Dr. B. had given me before leaving England, containing the Mahratti and the scientific appellations of the most important members of the Matheran Flora. Judge of our satisfaction when I found that in almost every case these wild people were able to give the names in their own language as accurately as, say, our friend Mr. Cunnack did the other day at Helston and the Lizard." Had Hassoo and his wife been among the guides, or called up from the hill-side by the "Hoia" of the Kotwal, the name of every small herb within reach might have been ascertained with equal, if not greater, accuracy. They were of the Thakùr tribe, and none of the Dhangurs could vie with them in their knowledge of the plants of the hill.

NOTE 4.—In addition to articles of field and domestic use, neatly and ingeniously made, the Thakùrs show no little taste and skill in the fabrication of their personal ornaments, such as neck-chains and bracelets or bangles, a collection of which, made by the writer, is now in the Indian Department of the South Kensington Museum. The material used for the neck-chains, which were unclasped and presented frankly by the women themselves, is not a grass but a Cyperus, which Mr. Dalzell identifies as the *Fimbristylis cylindrocarpa* described by Kûnth, from a specimen obtained by Wallich at Singapore. It grows on the sides

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of the hill. The strips of bark and grass of different colours of which the armlets are made are worked in designs resembling the Etruscan and other ancient forms; and the whole collection, which could probably be easily enlarged and enriched, is looked upon by Dr. Birdwood as a most interesting contribution in illustration of the early history of art. Fine basket-work of various kinds was brought up from Bombay, and given to the new Kotwal to be distributed among the people, as soon as their skill in such manufacture was discovered, and in the hope that they would turn it to profitable use; but the attempt failed for want, apparently, of that personal encouragement which these primitive people require, and by which they are so readily influenced when once their confidence has been gained.

NOTE 5.—There are still to be seen, in the upper part of the Bund valley, and on its northern side, traces of the practice of smelting iron-ore which was carried on before the felling of the Jambul was forbidden; and it is likely enough that specimens of the steel manufactured here may yet be attainable among the tribes. It may have been a branch of the same industry of which the remains, as described by Captain Burton last year, are still to be seen at Mahableshwur, the process of manufacture being also precisely similar to what is now practised in Central and Southern Africa, as well as in a modified way by the Russians, from an ore having the same properties which is found in Siberia. "The waved steel cakes," he further says, "were called 'Kurs'; and from early ages were supplied from old Golconda and the Sayhàdris to Persia, for the fabric of scimitars and dagger-blades." This seems to point to a time when the Dhangurs, and perhaps the Kutkurris before them, took a share in the commerce of the world;

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and the Thakùrs certainly, and very likely all, would do so again, in honey and wax and Tusseh silk, if not in other ways, were a little friendly help extended to them.

CHAPTER III.

NOTE 1.—A large proportion of the plants of the hill may be found figured in Wight's "Icones," though frequently under names that differ from those given by Graham, or by Dalzell and Gibson. These changes are very puzzling to the inexperienced; but, being unavoidable as science advances, the difficulty they present has to be overcome before the figures in the older works can be referred to with confidence. Graham's nomenclature is faulty in this respect that the commonest synonyms are often omitted, and it can on this account hardly be used in many cases without risk of repetition. It would seem, for instance, that his *Verbesina biflora*, now included in the Senecios, which covers the whole hill in October with its yellow flowers, is the *Doronicum reticulatum* of the text, a name given separately, because supposed to be applicable to another species, and if there are more cases of a like kind, it is only a closer familiarity from study or observation of the plants themselves that will lead to their correction. Even the most recent works on the Indian Flora are beset with difficulties of this nature, some of the most notable of the Matheran species being, like the common Capparis, either imperfectly distinguished from others of the same genus, or like the "Carallia," or "Rottlera," and a few more, so inadequately described, that their minute distinctions either remain unknown, or

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are only recorded in the notes of Mr. Dalzell on the specimens preserved in his Herbarium.

NOTE 2.—The "Carallia," however, is reported to be now growing at Kew from seeds that were sent from Matheran, and although it may be too much to expect that berries should develop in this country, a fuller description of it than has yet appeared is probably in preparation. This tree, the *Premna scandens*, *Rourea Santaloides*, *Acacia stipulata*, *Diospyros sylvatica*, and *Canthium Leschenhaultii*, show, according to Dalzell, a peculiar attachment to Matheran, and his impression is that they are hardly to be seen elsewhere within a radius of one or even two hundred miles, having leapt up, as it were, without scattering representatives, all the way from the Canara jungles. Whether this generalisation is quite a safe one may be open to inquiry, but it is worth recording as an instance of southern plants prevailing at such an elevation in a much higher latitude.

NOTE 3.—The pretty orchid *Phajus alba* was supposed once to come from a distance also, but although it may be more common on the eastern side of India, it grows freely in the grove at Lanowlee, and is more frequently to be met with at Khandalla than at Matheran. Other orchids of the hill not named in the text are *Æria microchilos* and *Cœloglossum luteum*, and several new grasses, as *Psilostachys*, (sp.?), *Lucæa* (sp.?), and *Oplismenus lanceolatus*, have been picked up, while two Ferns, found by Messrs. Boyd and Dods near Hart Point, and still on the hill-top, increase to twenty the number of species now known to be indigenous there. They were sent home to Mr. Dalzell for identification, and pronounced by him, in communication with Mr Baker, to be the *Polybotrya asplenifolia*, and *Trichomanes filicula*. Mr. H. Birdwood

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had long cultivated the former, but generally it was known only by report, and supposed to be a "Pœcilopteris," to which it bears a resemblance in habit, and in carrying its fructification on a separate frond. The diminutive Trichomanes, which appears to be new to the Bombay Flora, is an inhabitant of Mauritius, Bourbon, Nepal, and the Neilgherries.

NOTE 4.—Both of these are now to be seen in gardens along with the "Drynaria," a fine Oak-fern from below, and other introduced forms, all growing so freely that one wonders why the natives among them have not spread over the summit of the hill long ago. That this may happen seems probable enough, and it is therefore of interest to put on record how extremely restricted were their habitats before the economy of nature was disturbed. On the other hand there is some risk not only of these, but of others and better known species being lost to the hill. The "Athyrium" of the text, whether rightly so named or not, which was found on Gharbut, and grown afterwards in a sickly fashion, never coming to seed, by Mr. Dalzell at Dapoolie, has never been rediscovered. The *Nephrolepis tuberosa*, met with at Paunchgunny and elsewhere, and found on the rocks below the church at Matheran in early days, is said to have disappeared, while the *Nephrodium molle*, so common in other localities, as well as *Niphobolus adnascens*, and one or two more, are here so rare that they might easily be cleared away by inconsiderate collectors.

NOTE 5.—None of the foreign Ferns have as yet made their way into the woods, although for years past they have been cultivated in the gardens; nor, indeed, is any introduced plant known to be spreading over the hill in the marked manner not uncommon in the plains, and of which some striking illustrations are given in "Nature" of 31st

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December, 1874. Could the "Huryale" grass be got to spread here as those from Algeria are said to have sprung up and enriched the plains of Alsace, the gain would be immense. The change of climate would not be greater in the one case than in the other, but the rapid decrease of moisture, especially in the laterite soil, would probably interfere with the success of any such experiment.

NOTE 6.—A remarkable instance of the use of a weed common on the hill-side, known, although an "Acanthus," as the "Bhoorut" grass, *Achyranthes aspera*, is given in Col. Brooke's Report of the Rajpootana famine of 1868–69. "Many of the poor," he says, "supported themselves on it, and it supplied a means of subsistence to all who would take the trouble to collect it. Many families thus secure in a short time a year's supply of food, and this has been the salvation of the poor throughout Rajpootana during the whole of the past year, 1868–69. The flour from the seed of the 'Bhoorut' is a wholesome, palatable food, and in the Bazars fetches almost as high a price as Bajree. It requires a little labour to beat it out of its hard and prickly envelope, but when procurable at once secures the population against famine. In many cases Thakùrs and their families have lived on this seed, whilst they have bought Bajree to give to their Ryots to prevent them emigrating."

NOTE 7.—The value of this humble member of the Matheran Flora, and of other jungle plants brought to notice by Dr. King, which were described in the *Times of India* a few years since as good for food when famine is abroad, will have an interest at the present moment, though in a less degree, fortunately, than was felt in remote and isolated Rajpootana. A list of such plants, which, along with others of medicinal value, abound within easy range

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of Poona, on Matheran, the Ghauts, and the Deccan Hills, as well as of their localities, and a rough estimate of the quantities to be gathered from each, was under preparation when the writer left India; and he is able to state, from the materials collected in a short time, that there is room for much interesting, and not a little profitable, labour in this direction. In addition to the "Bhoorut," the plants named by Dr. King are the "Mothee," or root of *Hymenochæte grossa*, one of the Cyperaceæ, mixed more or less with those of other rushes, which is made into bread after being ground, with a little flour added; "Kejra," the bark of *Acacia leucophlæa;* "Gokhur Kantee," or capsules of a Tribulus of the N. O. Zygophyllaceæ, and represented by *Tribulus terrestris* in the Deccan; "Maleecha," the seed probably of an Eleusine; "Tilli," or refuse remaining from the seeds of the *Sesamum orientale* after the oil has been expressed; and lastly, the seeds of various cucurbitaceous plants, as melons and pumpkins, that are stored up for occasions of scarcity.

NOTE 8.—The Prickly-Comfrey and the Screw-Bean, that have attracted more recent attention as capable of being grown in India in the poorest soils and the driest climates, may prove useful additions to the indigenous plants, as well in seasons of famine as of plenty, in wide districts of country where barrenness and aridity are every year the prevailing conditions; and it is by means like this that the reclothing of the Deccan and other sterile tracts with vegetation may hopefully begin to be accomplished.

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CHAPTER IV.

MAMMALS.

NOTE 1.—A curious instance of the natural affinities of the Monkeys to the Lemurs occurred some years since at Belgaum, where a beautiful specimen of the latter family, captured and carried off as prize from the Temple of Beyt, was kept as a pet. A Macaque, that ran about half-wild in the garden, seeing this strange creature in the verandah, made at first the most cautious approaches to it, but taking special notice of its hands metaphorically shook them, and the two became at once fast friends. The intimacy being encouraged, they ate together, and played all day long, the Monkey, though much the smaller of the two, patronizing the Lemur, defending it from the intrusion of dogs, to which it had a great dislike, and soothing it when alarmed in the most tender and human fashion.

NOTE 2.—The mode of conveying its young adopted by the Musk-Rat is not noticed by Jerdon, but the expression "a leash of musk-rats" has been met with, either in reading or conversation, since the text was written. The surmise that the Madras Tree Shrew, or "Tupaia Elliotti," inhabits the hill has been confirmed by Major Hayes Lloyd, though specimens are still wanted to make sure that it is in all points identical with the species from the eastern coast. "At first sight," he remarks, "it is wonderfully like a squirrel, but the long mongoose-like head and insectivorous jaws at once distinguish it, while the large dark eye is so much in contrast to that of the Soricidæ, that the term 'Shrew' seems little applicable to it." It is more active on a tree than the

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squirrels themselves, and will often be seen in places where roads meet in company with them. The natives give it the name of "Kurri," in common with the *Sciurus tristriatus*, and regard it as an unstriped member of the family with which it is so often observed to associate.

NOTE 3.—The Tiger and Panther are still to be seen at times, though the omission of the words "as possible" from the text has occasioned no little banter at the unintentional exaggeration of the frequency of their visits. A few well-authenticated instances of meetings with them are on record, but as no unarmed man's behaviour before one or other of them on the path can be expected to bear criticism, the particulars of such events lose the angles in the memory, and are apt to be recorded in after times with some slight, if innocent, departures from strict reality. A gallant sergeant of Sappers, armed with a cutlass at his side, a revolver in his belt, and a rifle in his hand, came up one evening to the writer's bungalow, and in a voice tremulous with emotion, requested the honour of his company in an attack upon a panther he had met on Echo Point, and that had chased him and kept him a prisoner till dark in Forest Lodge. A kid was on its way from the Bazar, and a convenient tree selected from which the enemy could be shot to a certainty, and without a shadow of risk. Not quite seeing this, as the panther had not killed, and being but a poor shikari, with no feeling of revenge to be gratified nor of disgrace to be wiped out, the invitation was declined; but there, in the early morning, the pug was seen, and tracked along the foot-path as described by the sergeant.

A well-known Bombay lawyer was stopped in the Ghaut one night on account of the road being pre-occupied by a panther, and he resorted with success to the vociferous singing of "Rule Britannia" in order to clear the way. This,

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and the more recent occurrence at Porcupine Point, when the relator was supposed to have been anticipating more agreeable company than that either of *Stripes* or *Spots*, will be in the remembrance of many, as well as the gallant action of a lady who was with her husband when he shot a panther (that had killed the previous night) from their perch on a tree, as it passed beneath them towards the spot where the dead bullock lay. Later still, in a note from Major Lloyd about the birds he was in search of, he mentions casually having crossed in the morning the pug of a fair-sized tiger on the road to Elphinstone Lodge, so fresh on the ground as to suggest the possibility of an interview. Such are the chances, and nothing more, that are referred to in the text.

NOTE 4.—"Very few male quadrupeds," says Darwin, "possess weapons of two distinct kinds especially adapted for fighting with rival males. The Muntjac deer, however (the Bekrè of Matheran), offers an exception, the male being provided with horns, and exserted canine teeth, forms of weapons that in the course of time appear to be replaced the one by the other in this and allied classes of animals." The remark would have had greater force but for the fact that the canine teeth are common to both sexes in the Bèkrè, and must therefore have other uses which are also of more importance than those here specified.

NOTE 5.—The presence of the gall-bladder in the small Memimna, or Pisora of the hill, as in the Musk deer of the Himalayas, is remarkable, that organ being absent in all other members of the deer family. No opportunity occurred of verifying this; but on one occasion of the hunting down of a Bekrè, the Hospital-Assistant was instructed, in removing the entrails, to save the gall-bladder, and shortly afterwards the whole carcase and its contents were sent down

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with an expression of regret that the organ required had apparently been lost, although he couldn't say how.

Birds.

Note 1.—A complete list of the Matheran birds is still a desideratum, though there is reason to fear, from the reported destruction of many of the smaller species, that it will never now be so full as it would have been in years gone by, when as yet unmolested by collectors they swarmed in every patch of dense jungle. The best time for observing them is the early morning, an hour or so after sunrise. Some are awake and on the move with the first break of day, but as the sun's rays penetrate the deeper valleys it would seem as if they formed processions to give a welcome to the spreading warmth. Taking up a position unobtrusively near the head of a ravine between seven and eight o'clock, according to the season, crowds of all kinds will be seen flitting from tree to tree towards the sunshine, and it is at this hour, while so watching, that the best opportunity offers for becoming acquainted with such as come least into the open. A few of the rarest have only been seen on these occasions, and the most promising spots are never far from the springs, where they join the Flycatchers, Finches, and others fond of water, that would seem to be on their way to their favourite haunts from the pleasant morning bath they have just been enjoying. The route varies from time to time, whether through freak or fancy, or attraction of dainty food, was never quite apparent, and as they went along the Squirrels and the Tree Shrews would also show themselves with such regularity, that, rare as the latter are, they could almost to a certainty be met with in several places as the bird procession was going on.

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NOTE 2.—The graphic notes of Mr. Hume, vying in interest with anything that has been written by Jerdon himself, leave little to be told of the habits and habitats, the nesting and the eggs, of the birds of prey. It would seem that the Kites leave Bombay during the rains, not, as Dr. Buist thought, for breeding purposes, that process being over long before the monsoon, but to escape the heavy rain from which they cannot, like the crows, seek the shelter of verandahs and outhouses. The variation in the size of the eggs of Vultures is very remarkable, the cubic contents of those of *Gyps Bengalensis*, for instance, when at their largest being 2½ times that of the smallest, while the power of resistance to the effects of strychnine and arsenic in these birds are facts of great physiological interest, suiting them so admirably for the work they have to do. The epithet "Halalcore," it may be remarked, although applied to these and other creatures wallowing in all that is unclean, has in reality its true meaning quite opposed to this, and ought to designate persons or animals of the utmost conceivable purity. In addition to Mr. Hume's notes, the Linnean Society's Journal, in which small coloured maps are used to show the geographical distribution of the Raptores, may be mentioned, and Major Lloyd, in his Konkan pamphlet lately published, refers to some of this extensive family that are found in the district generally, and although not yet distinctly recognized there, are likely to frequent Matheran.

NOTE 3.—A list of the birds found at Khandalla in the month of May by Major Butler,[1] contains a number that may be sought for with some chance of success on the sides, and a few of them on the summit of the hill, among the most notable of which are the Shama, or *Kitticincla*

[1] See also Fairbank's List in "Stray Feathers."

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Macroura, the finest of Indian song-birds; the Indian Crested Swift (*Dendrochelidon coronatus*); the white-backed *Munia striata*; the bronze-winged Dove (*Calcophaps Indicus*); the Rufous Turtle-Dove (*Turtur Meena*); the Jungle Hornbill (*Tockus gingalensis*); Tickell's Blue Redbreast (*Cyornis Tickellii*); the Southern Sirkeer (*Taccocus Leschenhaultii*); the Ghat Night-Jar (*Caprimulgus atripennis*); and the Malabar Green Bulbul (*Phyllornis Malabaricus*). Some of these, he remarks, are not quite satisfactorily identified, such as the last, which may be "aurifrons," and the Caprimulgus, which may be another species. The Common Barbet (*Megalaima viridis*) may, he thinks, be "Caniceps," while Major Lloyd is in doubt whether to regard it merely as a local variety of "viridis," somewhat larger and differently marked, or as a distinct species which might be named *Megalaima Sykesii*. The universal Otocompsa again is "Fuscicaudata," not Jocosa; and Major Lloyd, when visiting the hill in 1872, found numbers of the *Phyllornis Jerdoni* feeding on the ripe berries of the Asauna tree, although they had escaped notice before. He mentions also *Grauculus macei* and *Tephridornis Pondicherriana*, the latter being the Wood-Shrike of the text, as well as the short-billed Minivet (*Pericocrotus brevirostris*); a Malacocircus that he thinks differs from "Somervillei," and most interesting of all, the *Hypsipetes ganeesa* of Sykes, of which nothing had been heard for thirty years or more, and which he regards therefore as quite a feather in the cap of Matheran. To these has since been added the beautiful *Pitta Bengalensis*, or Naorung, whose presence, though suspected, had not been ascertained before. These details are given to show much more what remains to be done, than as finishing touches to an accomplished work, for which materials have

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yet to be collected, if not for the ornithology of the summit, certainly for that of the surrounding jungles. Should Major Lloyd resume his labours on the spot, he might, with the aid of a veteran in the science now available, very soon complete this part of it in a way that would leave nothing to be desired, and we would fain hope that by one or both this may shortly be done.

Reptiles.

Note 1.—Had Günther's work been published in a popular form, the general acquaintance now happily extending with this class of animals might have been anticipated by at least a dozen years. It came like a revelation, but being addressed to limited numbers, the true appreciation of its value spread but slowly, and for the most part through secondary channels. Among its first fruits, besides many papers in the scientific journals, may be named the "Thanatophidia" of Fayrer, and still more directly, perhaps, the "Indian Snakes" of Nicolson, works that have met with, as they have deserved, a hearty welcome for the invaluable purpose they have served in making their subject the property of the public. Not much that is new may have been added to what Günther himself has written, but our knowledge has gained in precision, and to some degree in extent. by the well-conducted experiments and splendid illustrations of the larger work, as well as by the homelier drawings and interesting anatomical details that enrich the smaller one. No advance has been made in the discovery of remedies for snake-bite, the potash of Shortt, and the ammonia of Halford having, equally with herbs of every sort, failed lamentably after searching trial. Protection, according to Dr. Nicolson, may possibly be secured by repeated inoculation

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of the poison, and he inclines to the belief that the snake-charmers have recourse to this measure for safety, as was conjectured of Shires in the Drummond case in Australia; but for the general public he has no consolation save what may be derived from his own statistics, and his confident assurances that the very worst of Vipers are not nearly so bad as they are painted.

NOTE 2.—Be this as it may, it is disappointing to learn that so little hope can be held out of the successful extermination of the venomous snakes by rewards or otherwise; and when we hear of a Cobra having nineteen young (Nicolson), and a Daboia a family of thirty-nine (Shortt), each of which, six hours after birth, is capable of killing a partridge by its bite, the wonder grows that this interesting population, amounting as stated, in the neighbourhood of Bangalore, to 1,000 in the square mile, and yet hardly to be seen in an ordinary walk, does not, with other snakes which are as ten to one, overrun the whole country, and, while far more offensive, be as much in the way as the frogs and locusts of the plagues of Egypt.

NOTE 3.—What natural agencies are at work to keep in check this swarming pest is not made clear, but they must be very efficient at Matheran when Major Lloyd, in 1872, could write: "I have been out snake-hunting, and have come to the conclusion that you and Leith have cleared them all away, as I have not been able to find one." With the additional assurance from Drs. Fayrer and Francis that creosote, or carbolic acid, sprinkled about a house give complete protection, the most timid, even after reading the worst parts of Dr. Nicolson's book, may take heart again, and feel confidence returning that his brighter picture of the extreme rarity of accidents even where snakes abound, among the population generally, and especially among English resi-

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dents, agrees best with the records of experience on the hill as elsewhere.

NOTE 4.—His courage in handling the deadliest snakes, and in experimenting with their poison,[1] would lead to the expectation that we may yet learn much from him of the symptoms produced by the bites of the less-known species; and we trust, in spite of his quaintly-expressed fears of the consequences to his mental equilibrium, that he may soon be able to erect a Serpentarium, and allowed abundant opportunity to work in it. A lower estimate of the venomous power of the "Trimeresurus," and still more of the *Echis carinata*, than that given in the text, may prove to be the true one; although with regard to the latter, which being a real viper inserts its fang deeply, and throws out its poison in a jet, it is thought probable that the old evidence of its fatality in Sind may remain unshaken.

NOTE 5.—The opening of the duct that leads from the poison-gland into the mouth without entering the canal of the fang; whether this be a partial or a complete tube, seems now to be fully understood. It was first noticed in America in the description of the Rattlesnake, then accepted by the Australians as true of their most venomous species, which is also one of the Crotalidæ, and now confirmed as the common arrangement, both in this family and among the true Vipers, by Dr. Nicolson.

NOTE 6.—Nothing of moment has been added to our knowledge of the Matheran Reptiles of late years. More than once there has been a prospect of collections of them being made and sent to England, or Calcutta, to be named and classified; but, so far as is known, the field

[1] A notice of Professor Valentine's Researches on Viper-poison appears in the "Lancet" of May 19th, 1877. If Note 5 is true, his anatomy is antiquated.

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is still as imperfectly occupied as it was when the text was written.

Annelids, Crabs, and Spiders.

Note 1.—The concluding remarks on the last section is equally applicable to this. A description of the Land Shells, if not of other branches of it, seemed always within reach by one eminently fitted for the task; but leisure was awanting, and the opportunity passed away. In concert with Mr. Stolitzka, who visited Poona shortly before he went to Yarkund, and became interested in the whole natural history of its neighbourhood, much might have been done, and it may be long before a like chance offers again. The memoir on Spiders referred to in the text was his, and had an opportunity occurred of comparing the Matheran species with his drawings and descriptions, most of them would have been identified. An attempt was made by Mr. F. Hunter to represent some that were sent to him, but they had shrunk and faded in colour so quickly that nothing could be done with them. A few stray notes, therefore, have only been recorded on the creatures of this division, and mainly with reference to their habits as observed in the jungles.

Note 2.—In digging around a fine specimen of the web of the Galeodes Spider, the tube of which was sunk fully six inches into the ground, a number of maggots were found embedded in the loose earth, that appeared to be the stock of a home-farm intended to supply food when the usual imports failed, much as the Ants are said to make use of the Aphides that they foster in their nests. Whether the presence of the maggots is to be attributed to the Spider's providence, or to the accidental droppings of their eggs by the large flies caught in the web, the fact remains that in

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one way or the other provision is very effectually made against a rainy day.

NOTE 3.—Among a large colony of the Epeiræ that occupied the same tree from year to year on the Ghárbut ridge, a favourable chance was offered of watching the huge creatures spinning their powerful webs. They move round at a good pace with the head towards the centre, the fresh filament being pressed against the old with one of the hind feet at intervals of about half-an-inch. They do not, like some of their smaller allies, preserve a perfect parallelism between the threads, but make a nearer and nearer approach to it as the diameter of the circle in which they move diminishes. In the meshes are suspended here and there the egg-boxes or cocoons, which are worthy of notice. There are usually two of them enveloped together in a soft cotton-like bag two or three inches long, and one or more in diameter, the eggs being closely packed in the box, which has the appearance of a diminutive cheese-cake, and is covered by a lid which overlaps the lower part at the edges by the eighth of an inch. The young are thus beautifully protected in their downy envelope; and although it cannot be stated how long they are in hatching, a case of them taken from a web in October began to swarm about three weeks afterwards, and to spread like mites all over the table on which the egg-box was lying as a curiosity.

NOTE 4.—Among other means of allaying the intense pain of the Scorpion's sting may be mentioned the bruised leaves of the Jambool, which are always at hand on the hill, and said to be effectual. Like that of Bees, and opposed to that of the noxious Snakes, the poison of the Scorpion appears to be fatal to its own kind. It is even said to commit suicide, presumably, as in the instance recorded in "Nature," of November, 1874, by Dr. Bidie, of Madras,

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through the venomous, and not merely the mechanical force of its sting. The creature had the sun's rays directed upon it by means of a botanical lens, the effect of which was to make it run about hissing and spitting fiercely; and on repeating this half a dozen times, it suddenly plunged its sting into its own back, and was dead in half a minute.

NOTE 5.—There are said to be two distinct species of the Land Crab; and the small fish found in the streamlets of Matheran is believed to be a Loach, probably of the family of the Cobitidinæ, which, according to Dr. Day, is met with at elevations from two thousand feet and upwards above the sea-level throughout India.

INSECTS.

NOTE 1.—In 1871, Mr. F. Moore, of the Indian Museum, committed to the writer's care a small box containing types of species of the diurnal Lepidoptera, chiefly of the Western Presidency, to be placed in the Asiatic Society's charge as a nucleus for further collections. Dr. Leith, at the same time, prepared another case, in which he arranged about 170 specimens of other orders, some of them in both sexes, to accompany the former. They were not by any means picked specimens, as they were not intended for show, but for aiding in the identification of newly-caught ones, by which they were gradually to be replaced. Some of them had marks indicating the locality of capture, and these are retained in the cabinet that, at the suggestion of Mr. F. Hunter, and through Mr. Taylor's kindness, was provided for them. Those with a yellow paper underneath are from Matheran; red, Belgaum; white, Poona; and green, Southern Konkan, the Bombay captives being without any distinctive mark. A Book of Drawings by Mr. Hunter, now in the

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writer's possession, contains about 700 illustrations, including those in the boxes that had not been figured before; and, with a few exceptions from the north-west and the coast below, they are representative of the Bombay entomology. They have been very generally identified and named, though of some sent home in 1872 Mr. Moore thus writes:—"Herewith I return the two batches of sketches which you sent me to name. Many of these are entirely new to me, and I should much like, and would be greatly obliged, if you would kindly send me specimens of them, as well as of any others you can spare. A large number of specimens, wrapped in small three-cornered pieces of paper (unpinned), will come perfectly safe if packed in a small wooden box a quarter of an inch in thickness, and sent overland by post. I shall be much pleased if you will continually send me materials for naming, and it would save you trouble if you send a specimen instead of a drawing numbered for that purpose, and I can return you the numbers with the names attached, as it is very frequently impossible to determine even the group to which some belong without careful examination of the palpi, legs," &c.

NOTE 2.—When it becomes known how readily their labours may thus be utilised, amateurs even may do much to make the scientific knowledge of the insects, not only of Matheran, but of the whole country, popular.[1] There are indeed already materials enough collected for a fairly comprehensive account of those of the Western Presidency; and should the Indian Manual of Entomology long spoken of appear shortly, this portion of it will find such ample illustration as will cause it to be welcomed in Bombay as heartily as Jerdon's "Birds" or Günther's "Reptiles." A

[1] Witness the Atkinson Collections from Assam, &c., lately reported on by Mr. Moore.

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great advance has been made since 1870, about which time the British Museum collections were being revised and re-arranged, and while this was going on no correctly-classified lists of the different orders in any locality could readily be prepared. In Dr. Leith's case, for instance, there were thirty-four species of "Libellulidæ" from the Bombay Presidency, of which twenty-two only had been identified and named, while among the "Coleoptera" and "Diptera" of the same region, the blanks were also numerous. No doubt the facilities for study in the Museum are much greater now; but as they cannot be taken advantage of at present by the writer, a few notes that may be helpful to others are all he has to offer.

NOTE 3.—Many Lepidoptera have been added to the earlier lists of those found at Matheran. Among the Lycænas are *Roxus*, *Nila*, *Plinius*, *Cnepis*, and *Theophrastus*. Of the Pieridæ, *Callydryas Alcmæne*, *Pieris Glaucippe*, *Albina*, and *Phryne* if rightly recognised, and, more doubtfully, *Pieris Hecuba* and *Mesentina*. New Papilios are *Hector* and *Deiphobus*, which are very much alike in their markings; *Panope*, closely resembling the female of *Diadema Ange*; *Iswara*, larger than *Romulus* or *Polites*, without tails, and having a yellow spot on the under side of its upper wings to distinguish it; and *Dissimilis*, which is much like a *Euplœa Sarpedon*, was wrongly described as having a white band on its wings. It comes out so in a photograph, but the colour is bluish-green, and very rich in its tint. Instead of two, three Diademas should have been mentioned, the omission of one having led to confusion and inaccuracy in the description of them. It is "Bolina" that in the female sex mimics so closely *Euplœa chrysippus*. In the male, the large roundish spots on the under wings of this species are all white, as well as the smaller markings on the upper

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wings, while in "Misippus" they are wholly blue. "Ange," the third species, has the corresponding marks white in the centre and rimmed with blue, and there are other distinctions between the three of less note. The females of the two last, instead of being of a prevailing orange colour, with black and white markings like that of "Bolina," are of dark hues, while the white streaks and blotches towards the outer margins of the wings give them a resemblance in the case of "Misippus" to *Euplœa careta*, and of "Ange" to *Papilio panope*, though the mimicry is by no means so close as that of "Bolina" to *Euplœa chrysippus*. Having no specimen or drawing of the female "Ange" at hand, while the insect so called in Mr. Hunter's book appears to be "Misippus," a reference to the Museum would still be desirable in order to make all quite clear. Other Matheran butterflies not before noticed are *Junonia Orythia*, *Melanitis Banksia*, *Eronia Valeria* (which is very like, if not identical with, *Danais Algœa*, the white marks on which vary greatly in extent, appearing at one time as long streaks, and at another broken up into separate spots), *Pyrgus superna*, *purendra*, and another of the same genus unnamed, *Argynnis phalanta*, *Ismene aria*, *Yphthima Lysandra* and *Baldus*, *Politia Nina*, and no doubt many more that will be found hereafter on the Hill, though (whether as specimens in collections or as drawings) marked "Bombay," "Khandalla," &c., simply because they have been captured in the localities named. Nowhere are the white and yellow and some of the brown butterflies more abundant than about Lanowlee and the head of the Bhore Ghaut. They are seen in their season in flights like locusts, proceeding always from east to west, as if with the intention of depositing their eggs in the ravines where the Caterpillars can find food in plenty, and it is quite possible that during the storms that prevail in

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early October, and in some years, as 1871, when these notes were taken, as late as November, many may be carried towards Matheran. Some of the above marked "Khandalla," not usually seen on the Hill, might have been thus conveyed across, and the facility with which this may happen has been remarkably shown in balloon-ascents in the neighbourhood of Paris, where, as stated by M. Flammonier, "they were met with at a height of nearly 6,000 feet above the plain, and not looking put out as if they had lost their way, but flying around the balloon as in their natural element." A fine specimen of *Ornithoptera Pompeius* (?), that must have been wafted in this way from the Southern Konkan, was picked up by a zealous young entomologist in a garden at Poona, by whom also a figure of it was supplied for the "Book of Drawings."

NOTE 4.—In the latter are likewise represented numerous additions to the Moths of the Hill, but before alluding to them the following notes from General H. J. Barr and Mr. Forsyth Hunter are worth recording:—"I once got," the former writes, "a large number of the cocoons of the Tusseh worm from Dr. Gibson, and placed them in a bamboo cage of the cubic dimensions of 4½ feet, covered with muslin. The Moths came out strong and healthy about the beginning of May, and I collected a large number of eggs, which I packed in cotton and sent to Malta to the then Governor, begging that they might be cared for and sent on to the Emperor Napoleon, who was at that time, I heard, interesting himself in the improvement of the European varieties of silkworms. From that day to this I never heard anything of the eggs I sent; but I read in the papers of the introduction of the Indian silkworm into the south of France through the instrumentality indicated; so I have little doubt that I had the trouble and he the credit. Some of the eggs I

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kept in India, and obtained the worm; but, unfortunately (woeful end to so many experiments in this country), the monsoon coming on, I had to leave the esplanade where the feeding arrangements had been carried on, and owing to the move I lost all the young worms. While they lived they throve well, feeding on the leaves of the burr tree and castor-oil plant. One thing, I remember, struck me very forcibly, viz., that eggs laid by Moths without the possibility of their having been impregnated, after leaving the cocoon, hatched, and gave me the worms. I think I am right in saying that impregnation could not have occurred in the Moth, for my recollection is that some of the Moths which gave me fruitful eggs were kept singly both as cocoons and as Moths." In confirmation of General Barr's observations, it is reported in the *Lancet* of June 20, 1874, that "Mr. Balbiani exhibited eggs of the silkworm which had been deposited before fecundation could have been effected. A certain number of these eggs remained sterile, but others showed signs of development, though in no instance had the larva escaped from the egg. The number of these developing eggs varied extremely, according to the species of Moth by which they were deposited; the largest number was met with in those which produced several generations per annum. Amongst 9,000 eggs of a polyvoltine race, 513 came forth spontaneously; whilst amongst 50,000 ova of an annual race, 29 only were fertile. This enormous difference is probably owing to the feeble vitality of the egg in the annual races. However this may be, Mr. Balbiani thinks it can only be explained by admitting the hermaphrodism of the egg." [1]

Mr. F. Hunter's note has reference to the noises made by

[1] For a description of what is now being done in Bombay for sericulture, see *Times of India*, Overland Summary, dated April 23, 1877.

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Moths, and instances the Death's Head,[1] which, he says, squeaks in a manner that reminds him of the sound emitted by the Capricorn Beetles. One of the same family, the *Argiva hieroglyphica*, was observed by the writer on one occasion to make a snapping sound with its wings in turning quickly. A swarm of them were at play under an oombur tree as darkness was coming on, and at every turn a loud snap was heard, such as a bat makes when in pursuit of an insect. They were watched for some minutes, during which neither bat nor bird could be seen preying upon them, and on capturing one for identification the whole swarm immediately dispersed. Mr. Swinton, in the *Entomological Monthly Magazine* for March, 1871, states that *Hylophyla prasinana* produces "a strange twittering noise" in flying; and again in the number for August of the same year remarks that *Hylophyla quercana* makes "a membranous sound," caused, he thinks, "by the inner margin of the forewing catching a little horny thoracic plate when in the act of expanding." Mr. Hunter has also furnished some interesting observations about the periods at which Caterpillars of various kinds pass into and emerge from the chrysalis condition; but as he may have something to say on the subject himself, a reference only is made to them here. Should he have succeeded, after leaving India, in naming the insects correctly, his remarks will be more intelligible, and thereby enhanced in value. The observation in the text as regards *D. Nerii* at least being found on rose-bushes, he considers incorrect. It must have been another Caterpillar with some resemblance to it; or, if really the Daphnis, it may have been travelling towards an oleander that grew close by, or a jasmine, the leaves of which it has been known to consume.

[1] Edward, the Banff naturalist, describes well the sounds it emits. See Life, page 205.

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The larva of *Butocera rubra*, a beetle, is the great destroyer of the rose-bushes, and to a less extent the Looper-Caterpillars. In reference to this, the same indefatigable collector and draughtsman had another book prepared, illustrative of the Plants in and around Bombay, with the insects that frequent and feed upon them, photographs of which would be of some service in making us familiar with this useful and often practical part of the subject.

NOTE 5.—Of new Moths which have been identified there is a long list, and a goodly number of those figured are still unnamed. Very many are believed to be common to the Hill and other places; but having been captured chiefly in Bombay, a few only bear the "Matheran" mark, and a large proportion still await recognition there. Some have not been caught elsewhere, as *Polytela gloriosa*, *Polydesma boarmoides*, *Macroglossa stellatarum*, *Aloa sipahi*, and unnamed species of Micaria, Syntomis, and Lithosia, but almost surely they will be found on further search in the plains, or on the Ghauts likewise.

NOTE 6.—Of the orders of insects following the Lepidoptera few more species than those given in the text bear the mark of "Matheran," either in Dr. Leith's collections or Mr. Hunter's drawings, and anything approaching to a full list of such as are to be found there has still to be prepared. Notes on the immunity from the effects of the Bee-poison procured by inoculation have been taken both from the American and home journals of late years; and it seems now to be an accepted fact, that protection not only from this but also from the noxious secretions of other insects can in this way be obtained. Extracts from Darwin descriptive of the Mechanism of the Sounding Apparatus in various families of the Orthoptera have been made, which, with the lucid explanation he quotes from Landois of that by

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which the stridulation of the Cicadas is maintained, are of much interest. These, as well as some recent information about the Mantidæ, and a most graphic description by Colonel Brooke of the visitation of locusts to Rajpootana in the famine year, are tempting to repeat; but space forbids, and these notes must be brought to a close.

Efforts have been made to illustrate the little work to which they are appended, but under difficulties that cannot for the present be overcome. A local museum, either on the Hill or in Bombay, would very well meet the want; and were the Superintendent also a Naturalist, he would, amid such wealth of materials, be richly rewarded for his labour in establishing one.

LASSWADE, *May 24th*, 1877.

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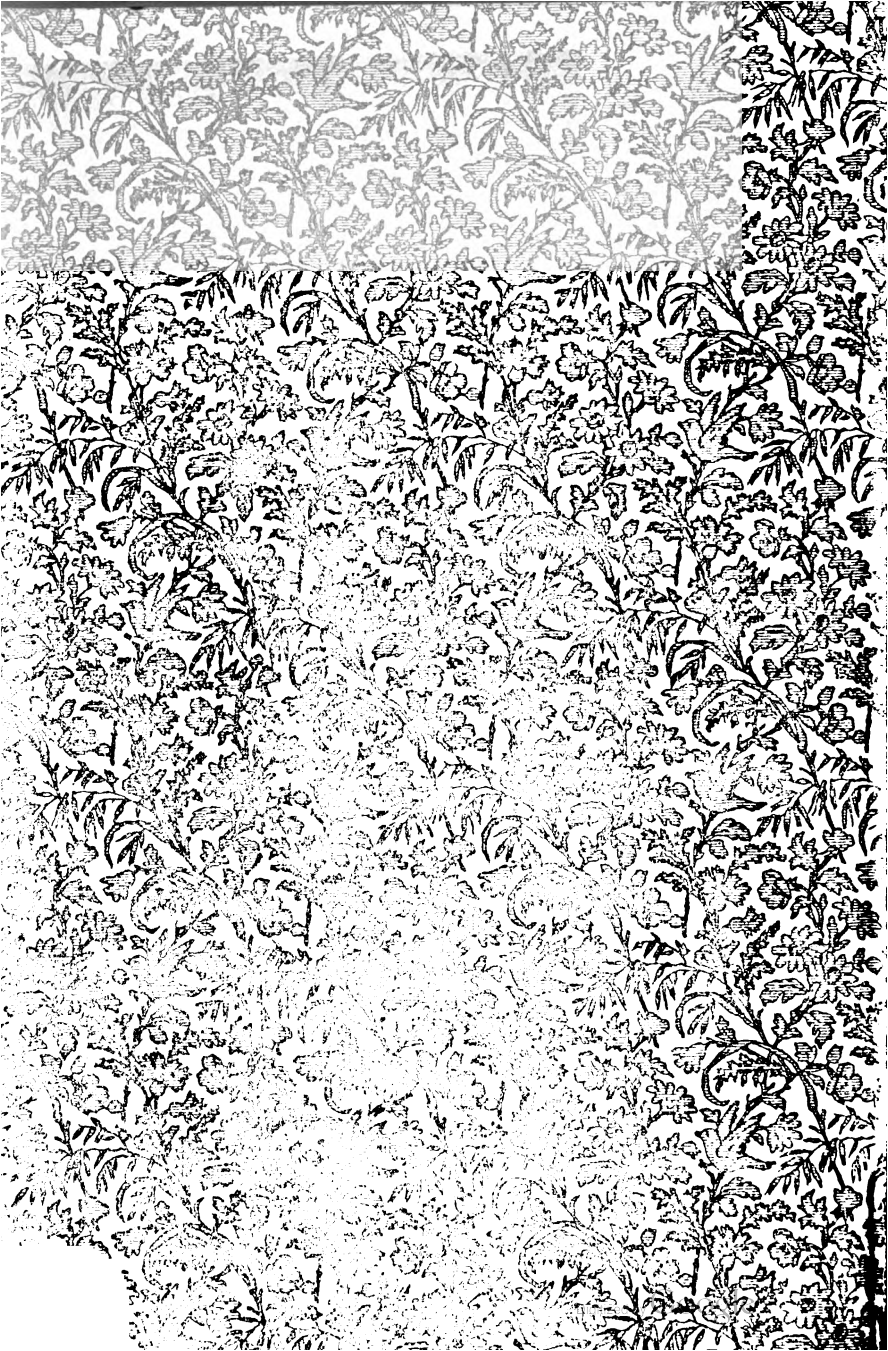

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